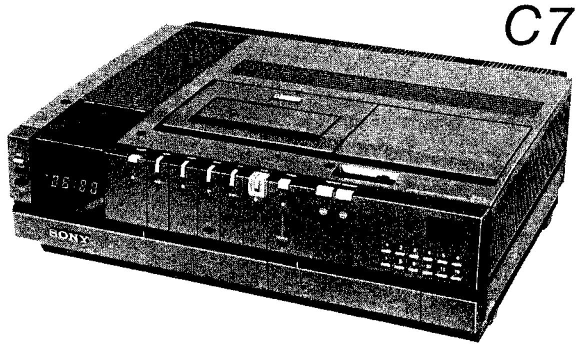
227

# SL-C7E/C7UB
# RMT-200

# SERVICE MANUAL

*C7E AEP Model*
*E Model*
*C7UB UK Model*
*HK Model*



December, 1979

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**The circuits and mechanical structure of model SL-C7UB and SL-C7E are almost identical.**

## SPECIFICATIONS

### General

| | |
|---|---|
| **Video recording system:** | Rotary two-head helical scanning |
| **Video signal:** | CCIR standards, PAL colour (SL-C7E)<br>British colour TV standards (SL-C7UB) |
| **Storage temperature:** | −20°C to +65°C (−4°F to +149°F) |
| **Operating temperature:** | 5°C to 40°C (41°F to 104°F) |
| **Aerial:** | 75-ohm, asymmetrical aerial socket |
| **Channel coverage:** | VHF Western European Channels E2–12 UHF Western European Channels E21–68 (a total of up to 12 preselected channels) (SL-C7E)<br>UHF channels 21-68 (a total of up to 12 preselected channels) (SL-C7UB) |
| **RF output signal:** | UHF channels E30 to E39 (variable) 75 ohms, unbalanced (SL-C7E)<br>UHF channels 30 to 39 (variable) 75 ohms, unbalanced (SL-C7UB) |
| **Power requirements:** | 110–127V, 220–240V AC ± 10% (adjustable), 50/60 Hz |
| **Power consumption:** | 45 W |
| **Dimensions:** | 485 x 163 x 379 mm (w/h/d) (19 1/8 x 6 1/2 x 15 inches) |
| **Weight:** | 15.5 kg (34 lb 3 oz) |

### Video

| | |
|---|---|
| **Input:** | VIDEO IN: BNC connector 1.0 V (p-p) $^{+1.0}_{-0.5}$ V (p-p), 75 ohms unbalanced, sync negative |
| **Output:** | VIDEO OUT: BNC connector 1.0 V (p-p) ±0.1 V (p-p), 75 ohms unbalanced, sync negative |
| **Horizontal resolution:** | Colour: 260 lines<br>B/W: 300 lines |
| **Signal-to-noise ratio:** | Colour: Better than 40 dB<br>B/W: Better than 43 dB |

### Audio

| | |
|---|---|
| **Input:** | AUDIO IN: Phono connector 47 kohms, −10 dBs.<br>MIC: mini jack −60 dBs, suitable for microphone with 600-ohm impedance |
| **Output:** | AUDIO OUT: Phono connector Less than 10 kohms, −5dBs (47 k ohm load), unbalanced |
| **Frequency response:** | 50 Hz to 10 kHz |
| **Signal-to-noise ratio:** | Better than 40 dB |
| **Audio distortion:** | Less than 4% at 400 Hz |

### Tape transport

| | |
|---|---|
| **Tape speed:** | 18.73 mm/sec. |
| **Maximum recording time:** | 2 hours 10 min (with Sony L-500 cassette)<br>3 hours 15 min (with L-750) |
| **Fast forward/rewind time:** | Within 3 1/2 min. (L-500) |
| **Timer:** | Only for recording<br>Electronic digital timer<br>24-hour-clock cycle<br>2 weeks 4 events |

**– Continued on next page –**

MICROFILM

Beta

# VIDEO CASSETTE RECORDER

SONY®

Consumer VIDEO

## Accessories supplied

Remote Commander RMT-200
Betamax Videocassette tape L-500
AC mains lead
75-ohm coaxial cable

## Remote commander

| | |
|---|---|
| **Remote control system:** | Infrared control |
| **Power requirements:** | 6 V dc<br>Battery size AA x 4<br>(IEC battery designation R6) |
| **Dimensions:** | 68 x 34 x 144 mm (w/h/d)<br>(2 3/4 x 1 3/8 x 5 3/4 inches) |
| **Weight:** | 220 g (8 oz)<br>including batteries |
| **Accessory supplied:** | Battery size AA 4 pcs. |

**SAFETY-RELATED COMPONENT WARNING !!**

**COMPONENTS IDENTIFIED BY SHADING AND ⚠ MARK ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.**

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# TABLE OF CONTENTS

- SL-C7UB

1. DIFFERENT PARTS LIST .............. 1
    1-1. MECHANICAL PARTS LIST ........... 1
    1-2. ELECTRICAL PARTS LIST ............ 1
2. TUNER BLOCK (CH-7, IF-10, TU-11, CI-1, PC-1 BOARD) ELECTRICAL PARTS LIST 2
3. PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM .............. 6
4. EXPLODED VIEWS ................... 13

- SL-C7E

The circuits and mechanical stracture of models SL-C7UB (HK model) and SL-C7UB are almost identical. Therefore, the difference between SL-C7UB (HK model) and SL-C7UB are shown below.

| Model<br>Description | SL-C7UB (HK model) | SL-C7UB |
|---|---|---|
| ⚠ CORD, power | 1-551-646-00 | 1-534-819-00 |
| LABEL, BEAB | ———— | 3-701-940-00 |

**The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.**

# 1. DIFFERENT PARTS LIST

## 1-1. MECHANICAL PARTS LIST

| Description / Model | SL-C7E Part No. | SL-C7UB Part No. | Page (SL-C7E) |
|---|---|---|---|
| LABEL, F mark | 3-656-407-00 | — | 4-1, 4-2 |
| CASE, upper | 3-662-292-00 | 3-662-292-21 | |
| LABEL, model number | 3-662-306-00 | 3-662-343-00 | |
| LABEL, preset manual | 3-662-321-00 | 3-662-348-00 | |
| LABEL, made in JAPAN | — | 3-701-690-00 | |
| LABEL, beab | — | 3-701-940-01 | |
| LABEL, caution main | — | 3-703-043-21 | |
| LABEL, caution | — | 3-703-082-21 | |
| LABEL, DEMKO | 4-310-380-00 | — | |
| LID ASS'Y, cassette-up | X-3662-214-0 | X-3662-221-0 | 4-3 |
| STICKER, C7E | 3-662-263-00 | — | |
| STICKER, C7UB | — | 3-662-342-00 | |
| HOLDER (R-3), LED | 3-662-227-00 | — | 4-5 |
| COVER (L-3), lamp | 3-662-230-00 | — | |
| CAUTION (B), UK ground | — | 3-701-961-01 | 4-14 |
| INDIVIDUAL CARTON ASS'Y | X-3662-220-0 | X-3662-226-0 | 4-15 |
| LABEL (GERMAN), explanation | 3-662-334-01 | — | |
| LABEL (FRENCH), explanation | 3-662-335-01 | — | |
| LABEL (DUTCH), explanation | 3-662-336-01 | — | |
| LABEL (SWEDISH), explanation | 3-662-337-01 | — | |
| MANUAL, instruction | 3-783-007-11 | 3-783-172-41 | |
| INSTRUCTION | 3-794-584-11 | — | |
| MANUAL, instant information (E/G/F) | 3-794-585-11 | — | |
| MANUAL, instant information (D/S) | 3-794-586-11 | — | |
| MANUAL, instant information | — | 3-794-812-41 | |
| MANUAL, instant information; timer (D/S) | 3-794-603-11 | — | |
| MANUAL, instant information; timer (G/F) | 3-794-604-11 | — | |

## 1-2. ELECTRICAL PARTS LIST

| | Description / Model | SL-C7E Part No. | SL-C7UB Part No. | Page (SL-C7E) |
|---|---|---|---|---|
| | TU-11 Board, complete | A-6721-037-A | A-6721-043-A | 4-5 |
| | IF-10 Board, complete | A-6721-038-A | A-6721-044-A | |
| | CH-3 Board, complete<br>or CH-7 Board, complete | A-6725-154-A<br>or A-6725-175-A | —<br>A-6725-170-A | |
| | PC-1 Board | 1-601-835-00 | 1-601-835-14 | |
| ⚠ | UHF tuner | 1-463-242-00 (U322) | 1-463-236-00 (U321) | |
| ⚠ | VHF tuner | 1-463-243-00 (V314) | — | |
| ⚠ | RF modulator | 1-464-105-00 | 1-464-116-00 | |
| ⚠ | Switching regulator<br>C106, C107 | 1-413-045-00<br>1-161-743-11 0.0022 AC400V | 1-413-051-00<br>1-161-826-11 0.001 AC400V | 3-41 |
| ⚠ | CORD, power | — | 1-534-819-00 | — |
| | PIN, cable | 1-555-110-00 | 1-555-111-00 | 5-24 |

**The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.**

## 2. TUNER BLOCK (CH-7, IF-10, TU-11, CI-1, PC-1 BOARD) ELECTRICAL PARTS LIST

### CH-7 BOARD

| *Ref. No.* | *Part No.* | *Description* | | *Remark* |
|---|---|---|---|---|
| ♠ | A-6725-170-A | CH-7 Board, Complete | | |
| C1 | 1-131-347-00 | 1 | 35V | tantalum |
| C2 | 1-108-251-00 | 0.1 | | mylar |
| C3 | 1-161-323-00 | 0.001 | | |
| C4, 5 | 1-161-319-00 | 470p | | |
| C6 | 1-108-365-00 | 0.001 | 100V | mylar |
| C8 | 1-161-021-00 | 0.047 | | |
| C9 | 1-161-271-00 | 100p | | |
| C10 | 1-123-359-00 | 47 | 50V | elect |
| C11, 12 | 1-123-316-00 | 10 | 16V | elect |
| C14 | 1-161-323-00 | 0.001 | | |
| C15 | 1-123-352-00 | 1 | 50V | elect |
| C16 | 1-131-345-00 | 0.47 | 35V | tantalum |
| C17 | 1-161-021-00 | 0.047 | | |
| C18 | 1-123-352-00 | 1 | 50V | elect |
| C19 | 1-161-013-00 | 0.01 | | |
| C20 | 1-161-271-00 | 100p | | |
| C21 | 1-161-263-00 | 22p | | |
| C22 | 1-161-271-00 | 100p | | |
| C23 | 1-108-820-00 | 0.22 | mylar | |
| C24 | 1-161-265-00 | 33p | | |
| C25 | 1-123-228-00 | 1 | 50V | elect |
| C26, 27 | 1-161-223-00 | 0.022 | | |
| C28 | 1-123-353-00 | 2.2 | 50V | elect |
| C29 | 1-161-013-00 | 0.01 | | |
| C30 | 1-131-349-00 | 2.2 | 35V | tantalum |
| C31 | 1-161-323-00 | 0.001 | | |
| C32 | 1-123-228-00 | 1 | 50V | elect |
| C33 | 1-131-345-00 | 0.47 | 35V | tantalum |
| ♠CN2 | 1-508-735-21 | 5p Connector | | |
| ♠CN3 | 1-508-736-00 | 10p Connector | | |
| ♠CN4 | 1-508-847-00 | 4p Connector | | |
| ♠CN5 | 1-508-848-00 | 6p Connector | | |
| ♠CN6 | 1-508-735-00 | 5p Connector | | |
| ♠CN7 | 1-508-847-00 | 4p Connector | | |
| ♠CN8 | 1-508-742-00 | 3p Connector | | |
| ♠CN9 | 1-508-849-00 | 8p Connector | | |

| *Ref. No.* | *Part No.* | *Description* | | *Remark* |
|---|---|---|---|---|
| D2–5 | 8-719-815-55 | 1S1555 | | |
| D10 | 8-719-815-55 | 1S1555 | | |
| ⇒D11–15 | 8-719-311-23 | SEL1122P-N | | |
| D19 | 8-719-812-31 | TLR123 | | |
| ⇒IC1 | 8-758-040-00 | CX804 | | |
| IC2 | 8-759-040-46 | MC14046BCP | | |
| IC3 | 8-757-610-00 | CX761 | | |
| IC4 | 8-757-600-00 | CX760 | | |
| IC5 | 8-759-108-05 | μPC78L05A | | |
| IC6 | 8-759-240-12 | TC4012BP | | |
| IC7, 8 | 8-759-240-11 | TC4011BP | | |
| IC9 | 8-759-965-60 | BA656 | | |
| IC10 | 8-759-240-11 | TC4011BP | | |
| IC11 | 8-759-240-12 | TC4012BP | | |
| IC12 | 8-759-157-40 | μPC574J | | |
| L1 | 1-407-184-xx | 3.3μH | | |
| Q1 | 8-729-902-11 | 2SC2021 | | |
| Q2 | 8-729-993-72 | 2SA937 | | |
| Q4 | 8-729-902-11 | 2SC2021 | | |
| Q5 | 8-729-139-04 | 2N3904 | | |
| ⇒Q6 | 8-724-375-01 | 2SC403C | | |
| Q7, 8 | 8-729-993-72 | 2SA937 | | |
| R6 | 1-202-463-00 | 2.2M | 1/4W | composition |
| ⚠R73, 74 | 1-213-155-00 | 10k | 1W | metal oxide (nonflammable) |
| RV1 | 1-224-251-xx | 4.7k, adjustable | | |
| S1–5 | 1-552-174-00 | Pushbutton | | |
| S6, 7 | 1-516-226-00 | Slide | | |

## CI-1 BOARD

| *Ref. No.* | *Part No.* | *Description* | | *Remark* |
|---|---|---|---|---|
| ● | 1-601-831-00 | CI-1 Board | | |
| ●CN10 | 1-508-849-00 | 8p Connector | | |
| D20 | 8-719-803-26 | TLR326 | | |
| IC13 | 8-759-997-64 | SN29764N | | |
| S10–21 | 1-552-412-00 | Keyboard | | |

## IF-10 BOARD

| *Ref. No.* | *Part No.* | *Description* | | *Remark* |
|---|---|---|---|---|
| ● | A-6721-044-A | IF-10 Board, Complete | | |
| C501, 502 | 1-161-047-00 | 0.0047 | | |
| C503 | 1-161-272-00 | 120p | | |
| C504–509 | 1-161-047-00 | 0.0047 | | |
| C510 | 1-123-355-00 | 4.7 | 50V | elect |
| C511 | 1-123-316-00 | 10 | 16V | elect |
| C512 | 1-161-047-00 | 0.0047 | | |
| C513 | 1-161-280-00 | 12p | | |
| C514 | 1-102-529-00 | 100p | | |
| C515 | 1-161-323-00 | 0.001 | | |
| C516 | 1-123-321-00 | 220 | 16V | elect |
| C517 | 1-101-006-00 | 0.047 | | |
| C518 | 1-103-725-00 | 0.001 | | styrol |
| C519 | 1-161-051-00 | 0.01 | | |
| C520, 521 | 1-101-006-00 | 0.047 | | |
| C523 | 1-108-385-00 | 0.047 | 100V | mylar |
| C524–526 | 1-161-047-00 | 0.047 | | |
| C527 | 1-102-852-00 | 47p | | |
| C528 | 1-102-525-00 | 68p | | |
| C529 | 1-161-249-00 | 1.5p | | |
| C530 | 1-161-259-00 | 10p | | |

| *Ref. No.* | *Part No.* | *Description* | | *Remark* |
|---|---|---|---|---|
| C531–534 | 1-161-047-00 | 0.047 | | |
| C535 | 1-123-320-00 | 100 | 16V | elect |
| C536 | 1-161-267-00 | 47p | | |
| C537 | 1-123-323-00 | 470 | 16V | elect |
| C538 | 1-161-047-00 | 0.047 | | |
| C539 | 1-123-353-00 | 2.2 | 50V | elect |
| CF501 | 1-409-333-00 | Trap, ceramic | | |
| CF502 | 1-527-262-00 | Ceramic, filter | | |
| ●CN501 | 1-508-743-00 | 5p Connector | | |
| ●CN503 | 1-508-797-00 | 4p Connector | | |
| ⇒IC501 | 8-759-014-40 | TBA1440G | | |
| IC502 | 8-759-651-35 | M5135p | | |
| IC503 | 8-759-001-20 | TBA120UB | | |
| L501 | 1-404-221-00 | Coil, IF | | |
| L502 | 1-407-184-XX | 3.3μH | | |
| L503 | 1-407-159-XX | 15μH | | |
| L504 | 1-407-157-XX | 10μH | | |
| L505 | 1-407-184-XX | 3.3μH | | |
| Q501 | 8-765-300-00 | 2SC2009 | | |
| ⇒Q502, 503 | 8-729-663-47 | 2SC1364 | | |
| ⚠R517 | 1-247-005-00 | 100 | 1/4W | carbon (nonflammadde) |
| RV501 | 1-224-645-XX | 10k, adjustable | | |
| RV502 | 1-224-644-XX | 4.7k, adjustable | | |
| SF501 | 1-404-190-00 | Filter, surface wave | | |

| *Ref. No.* | *Part No.* | *Description* | | *Remark* |
|---|---|---|---|---|
| T501 | 1-404-206-00 | IFT | | |
| T502 | 1-404-207-00 | VIF | | |
| T503 | 1-404-203-00 | VIF | | |
| T504 | 1-403-810-00 | AFT Discri (Pri) | | |
| T505 | 1-403-811-00 | AFT Discri (Sec) | | |
| T506 | 1-404-135-00 | SIF Discri | | |
| T507 | 1-404-097-00 | SIFT | | |

## PC-1 BOARD

| *Ref. No.* | *Part No.* | *Description* | | *Remark* |
|---|---|---|---|---|
| ● | A-6723-132-A | PC-1 Board, complete | | |
| C1 | 1-123-316-00 | 10 | 16V | elect |
| C2 | 1-102-074-00 | 0.001 | | |
| C3 | 1-123-316-00 | 10 | 16V | elect |
| ●CN501 | 1-508-743-00 | 5p Connector | | |
| ●CN502 | 1-508-797-00 | 4p Connector | | |
| ⇒D1 | 8-719-162-07 | RD6.2E | | |
| Q1, 2 | 8-729-663-47 | 2SC1364 | | |
| Q10 | 8-729-663-47 | 2SC1364 | | |
| Q11 | 8-760-523-10 | 2SA772 | | |
| Q12, 13 | 8-729-663-47 | 2SC1364 | | |
| RVl | 1-224-643-XX | 2.2k, adjustable | | |

## TU-11 BOARD

| *Ref. No.* | *Part No.* | *Description* | | *Remark* |
|---|---|---|---|---|
| ● | A-6721-043-A | TU-11 Board, complete | | |
| C105 | 1-102-884-00 | 33p | | |
| C106 | 1-102-863-00 | 82p | | |
| C107 | 1-102-884-00 | 33p | | |
| C108 | 1-102-889-00 | 39p | | |
| C109 | 1-102-125-00 | 0.0047 | | |

| *Ref. No.* | *Part No.* | *Description* | | *Remark* |
|---|---|---|---|---|
| C105 | 1-102-884-00 | 33p | | |
| C106 | 1-102-863-00 | 82p | | |
| C107 | 1-102-884-00 | 33p | | |
| C108 | 1-102-889-00 | 39p | | |
| C109 | 1-102-125-00 | 0.0047 | | |
| C110 | 1-102-963-00 | 33p | | |
| C111 | 1-102-125-00 | 0.0047 | | |
| C112 | 1-102-953-00 | 18p | | |
| C113 | 1-102-676-00 | 68p | | |
| C114 | 1-121-419-00 | 220 | 6.3V | elect |
| C115 | 1-121-806-00 | 10 | 16V | elect (nonpolarized) |
| C116 | 1-123-319-00 | 47 | 16V | elect |
| C117 | 1-123-352-00 | 1 | 50V | elect |
| C118 | 1-108-591-00 | 0.033 | | mylar |
| C119 | 1-108-367-00 | 0.0015 | 100V | mylar |
| C120 | 1-123-320-00 | 100 | 16V | elect |
| C121 | 1-123-319-00 | 47 | 16V | elect |
| C122, 123 | 1-123-351-00 | 0.47 | 50V | elect |
| C124 | 1-102-973-00 | 100p | | |
| C125 | 1-123-359-00 | 47 | 50V | elect |
| C126 | 1-123-383-00 | 4.7 | 100V | elect |
| C127 | 1-108-389-00 | 0.1 | 100V | mylar |
| C128 | 1-102-125-00 | 0.0047 | | |
| C130 | 1-108-820-00 | 0.22 | | mylar |
| C131 | 1-123-317-00 | 22 | 16V | elect |
| C132 | 1-108-595-00 | 0.047 | | mylar |
| C133 | 1-108-249-00 | 0.068 | | mylar |
| C134 | 1-161-265-00 | 33p | | |
| C136 | 1-123-319-00 | 47 | 16V | elect |
| C137 | 1-123-316-00 | 10 | 16V | elect |
| ●CN101 | 1-508-797-00 | 4p Connector | | |
| ●CN102 | 1-508-743-00 | 5p Connector | | |
| ●CN103 | 1-508-910-00 | 12p Connector | | |
| ●CN104 | 1-508-743-00 | 5p Connector | | |
| ●CN105 | 1-508-845-00 | 6p Connector | | |
| ●CN107 | 1-508-742-00 | 3p Connector | | |
| ●CN108 | 1-508-845-00 | 6p Connector | | |
| ⇒D101, 102 | 8-719-815-85 | 1S1585 | | |
| ⇒D103 | 8-719-127-25 | RD27E-B2Z | | |
| D104 | 8-719-815-55 | 1S1555 | | |

| *Ref. No.* |
|---|
| L101 |
| L102, 103 |
| L104 |
| L105 |
| L106 |
| Q101 |
| ⇒Q102 |
| ⇒Q103 |
| Q104 |
| ⇒Q106 |
| ⇒Q107, 108 |
| ⚠R126 |
| RV101 |
| T101 |
| T102 |
| ⚠TU101 |

**The com**
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**specified.**

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  require
  ticipate
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  m

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| T501 | 1-404-206-00 | IFT | |
| T502 | 1-404-207-00 | VIF | |
| T503 | 1-404-203-00 | VIF | |
| T504 | 1-403-810-00 | AFT Discri (Pri) | |
| T505 | 1-403-811-00 | AFT Discri (Sec) | |
| T506 | 1-404-135-00 | SIF Discri | |
| T507 | 1-404-097-00 | SIFT | |

## PC-1 BOARD

| | | | |
|---|---|---|---|
| ♠ | A-6723-132-A | PC-1 Board, complete | |
| C1 | 1-123-316-00 | 10 16V elect | |
| C2 | 1-102-074-00 | 0.001 | |
| C3 | 1-123-316-00 | 10 16V elect | |
| ♠CN501 | 1-508-743-00 | 5p Connector | |
| ♠CN502 | 1-508-797-00 | 4p Connector | |
| ⇒D1 | 8-719-162-07 | RD6.2E | |
| Q1, 2 | 8-729-663-47 | 2SC1364 | |
| Q10 | 8-729-663-47 | 2SC1364 | |
| Q11 | 8-760-523-10 | 2SA772 | |
| Q12, 13 | 8-729-663-47 | 2SC1364 | |
| RV1 | 1-224-643-XX | 2.2k, adjustable | |

## TU-11 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ♠ | A-6721-043-A | TU-11 Board, complete | |
| C105 | 1-102-884-00 | 33p | |
| C106 | 1-102-863-00 | 82p | |
| C107 | 1-102-884-00 | 33p | |
| C108 | 1-102-889-00 | 39p | |
| C109 | 1-102-125-00 | 0.0047 | |
| C105 | 1-102-884-00 | 33p | |
| C106 | 1-102-863-00 | 82p | |
| C107 | 1-102-884-00 | 33p | |
| C108 | 1-102-889-00 | 39p | |
| C109 | 1-102-125-00 | 0.0047 | |
| C110 | 1-102-963-00 | 33p | |
| C111 | 1-102-125-00 | 0.0047 | |
| C112 | 1-102-953-00 | 18p | |
| C113 | 1-102-676-00 | 68p | |
| C114 | 1-121-419-00 | 220 6.3V elect | |
| C115 | 1-121-806-00 | 10 16V elect (nonpolarized) | |
| C116 | 1-123-319-00 | 47 16V elect | |
| C117 | 1-123-352-00 | 1 50V elect | |
| C118 | 1-108-591-00 | 0.033 mylar | |
| C119 | 1-108-367-00 | 0.0015 100V mylar | |
| C120 | 1-123-320-00 | 100 16V elect | |
| C121 | 1-123-319-00 | 47 16V elect | |
| C122, 123 | 1-123-351-00 | 0.47 50V elect | |
| C124 | 1-102-973-00 | 100p | |
| C125 | 1-123-359-00 | 47 50V elect | |
| C126 | 1-123-383-00 | 4.7 100V elect | |
| C127 | 1-108-389-00 | 0.1 100V mylar | |
| C128 | 1-102-125-00 | 0.0047 | |
| C130 | 1-108-820-00 | 0.22 mylar | |
| C131 | 1-123-317-00 | 22 16V elect | |
| C132 | 1-108-595-00 | 0.047 mylar | |
| C133 | 1-108-249-00 | 0.068 mylar | |
| C134 | 1-161-265-00 | 33p | |
| C136 | 1-123-319-00 | 47 16V elect | |
| C137 | 1-123-316-00 | 10 16V elect | |
| ♠CN101 | 1-508-797-00 | 4p Connector | |
| ♠CN102 | 1-508-743-00 | 5p Connector | |
| ♠CN103 | 1-508-910-00 | 12p Connector | |
| ♠CN104 | 1-508-743-00 | 5p Connector | |
| ♠CN105 | 1-508-845-00 | 6p Connector | |
| ♠CN107 | 1-508-742-00 | 3p Connector | |
| ♠CN108 | 1-508-845-00 | 6p Connector | |
| ⇒D101, 102 | 8-719-815-85 | 1S1585 | |
| ⇒D103 | 8-719-127-25 | RD27E-B2Z | |
| D104 | 8-719-815-55 | 1S1555 | |
| L101 | 1-407-186-XX | 4.7μH | |
| L102, 103 | 1-407-178-XX | 1μH | |
| L104 | 1-407-169-XX | 100μH | |
| L105 | 1-407-696-00 | 18μH | |
| L106 | 1-407-169-XX | 100μH | |
| Q101 | 8-765-300-00 | 2SC2009 | |
| ⇒Q102 | 8-724-375-01 | 2SC403C | |
| ⇒Q103 | 8-729-612-77 | 2SA1027R | |
| Q104 | 8-729-663-47 | 2SC1364 | |
| ⇒Q106 | 8-760-413-10 | 2SC1475 | |
| ⇒Q107, 108 | 8-729-663-47 | 2SC1364 | |
| ⚠R126 | 1-246-979-00 | 1.2 1/8W carbon (nonflammable) | |
| RV101 | 1-224-645-XX | 10k, adjustable | |
| T101 | 1-404-096-00 | VHF | |
| T102 | 1-446-585-00 | Convertor | |
| ⚠TU101 | 1-463-236-00 | UHF ET Tuner U321 | |

**The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.**

- Items marked "♠" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- ⇒ : Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

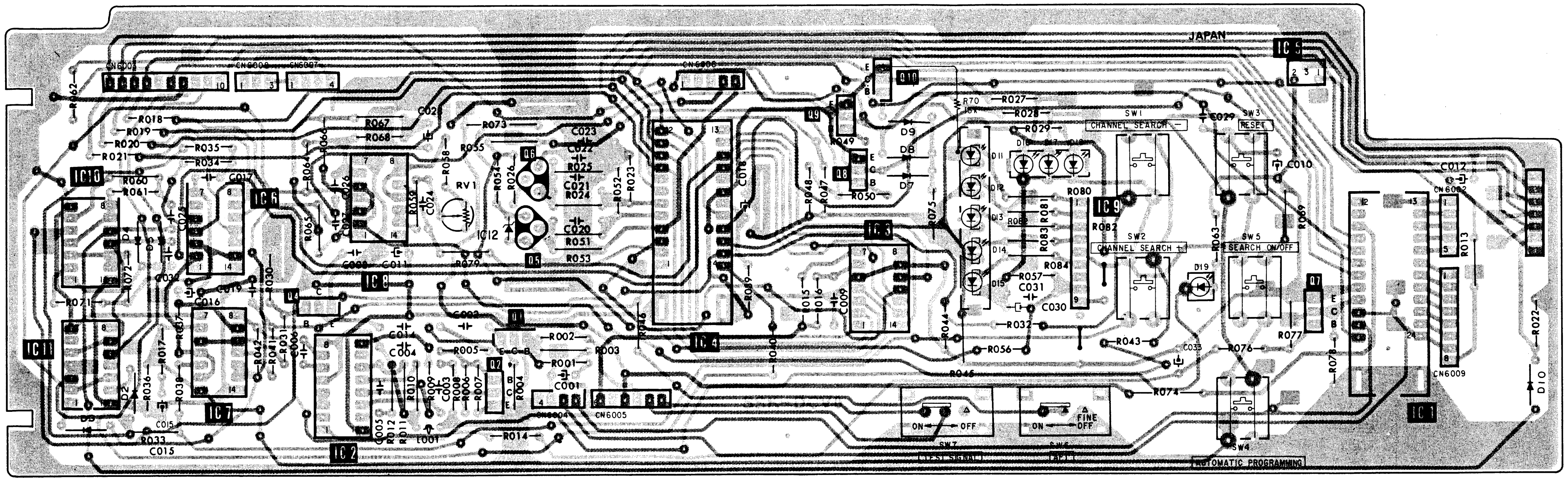
## 3. PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM

### CH-7 (AUTO TUNING), CI-1 (CHANNEL INDICATOR), PC-1 (REG), TU-11 (TUNER) AND IF-10 (VIF, SIF, AFT) PRINTED WIRING BOARDS

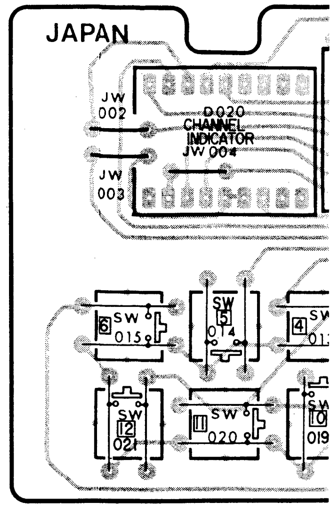
– Ref. No. CH-7, CI-1 BOARDS: 6000 Series PC-1 BOARD: 6500 Series TU-11 BOARD: 8100 Series IF-10 BOARD: 85

CH-7 BOARD

| | | |
|---|---|---|
| Q<br>IC | IC10 IC11 IC6 IC7 Q4 IC8 IC2 IC12 Q2 Q1 Q6 Q5 IC4 Q9 Q8 Q10 IC3 IC9 IC5 Q7 IC1 | Q<br>IC |
| D | 3 4 2 5 9 8 7 11 ~ 15 16 17 18 19 10 | D |
| ADJ | RV1 | ADJ |

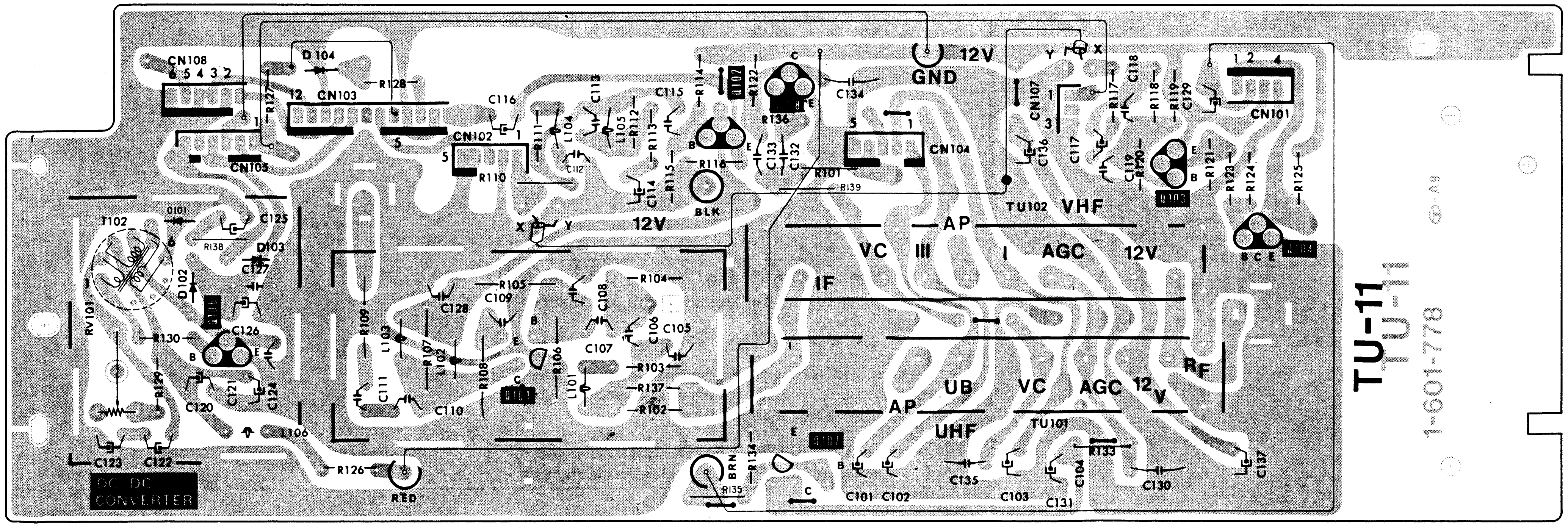

JAPAN
IC10
IC11
IC6
IC7
IC8
IC2
IC12
IC4
IC3
IC9
IC5
IC1
Q10
CN6003
CN6006
CN6007
CN6008
CN6004
CN6005
CN6009
RV1
SW1 CHANNEL SEARCH
SW2 CHANNEL SEARCH
SW3 RESET
SW5 SEARCH ON/OFF
SW4 AUTOMATIC PROGRAMMING
ON OFF
ON FINE OFF

CI-1 BOARD


JAPAN
JW 002
D020 CHANNEL INDICATOR
JW 004
JW 003

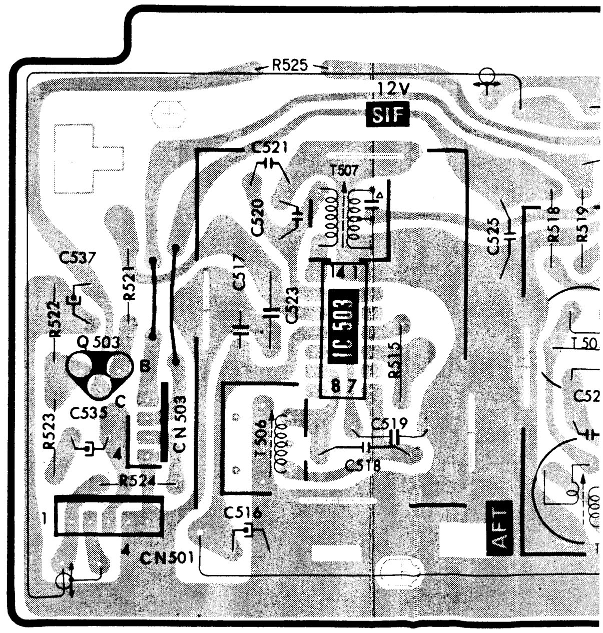
TU-11 BOARD

| | | |
|---|---|---|
| Q | 106 101 102 108 107 103 104 | Q |
| D | 101 102 103 104 | D |
| ADJ | RV101 | ADJ |

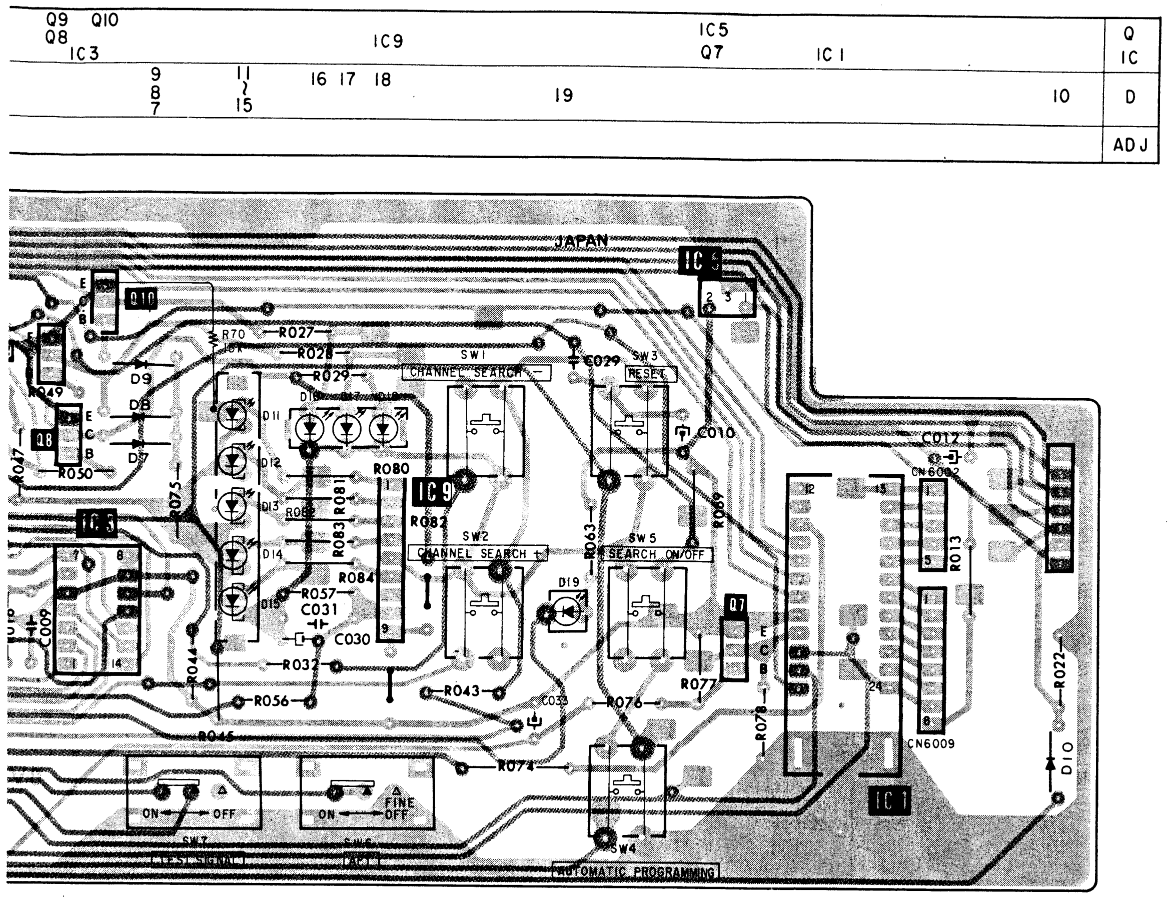

CN108
D104
CN103
CN105
CN102
CN104
CN101
12V
GND
BLK
RED
BRN
T102
RV101
TU102 VHF
VC
III
I
AGC
12V
AP
IF
RF
UB
VC
AGC
12V
AP
UHF
TU101
DC-DC CONVERTER
TU-11
TU-11
1-601-778

IF-10 BOARD

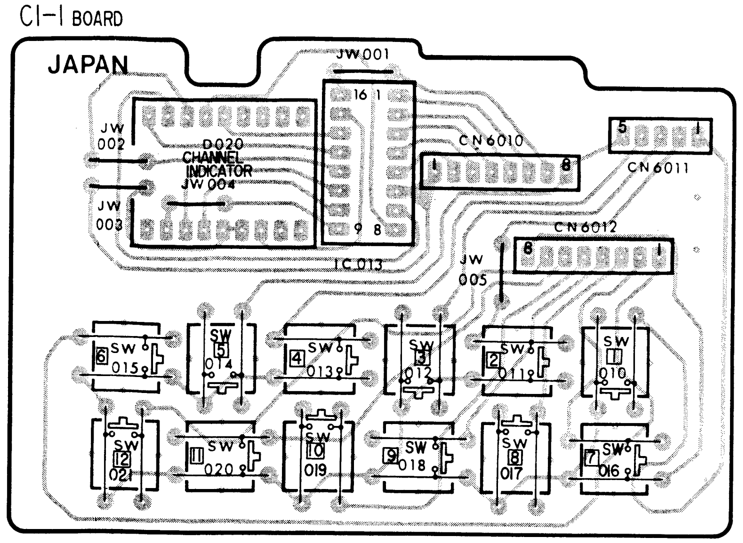
| | | |
|---|---|---|
| IC<br>Q | 503 IC503 | |
| ADJ | | |


R525
12V
SIF
C521
T507
IC503
Q503
CN503
T506
CN501
AFT

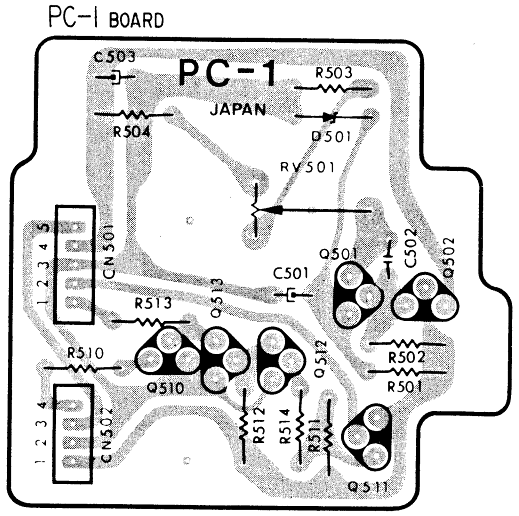
**AND IF-10 (VIF, SIF, AFT) PRINTED WIRING BOARDS** – Ref. No. CH-7, CI-1 BOARDS: 6000 Series PC-1 BOARD: 6500 Series TU-11 BOARD: 8100 Series IF-10 BOARD: 8500 Series CHASSIS: 9500 Series –

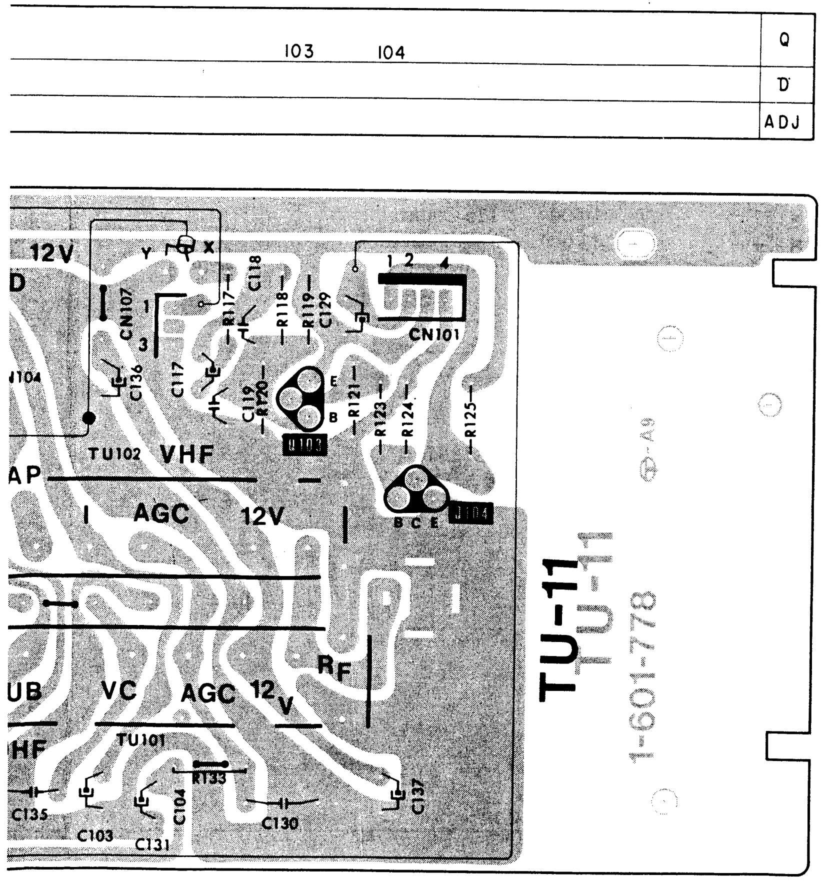

Q9 Q10 Q8 IC3 IC9 IC5 Q7 IC1
Q
IC
9 8 7 11 ~ 15 16 17 18 19 10
D
ADJ
JAPAN
IC5
Q10
Q8
IC3
IC9
IC1
Q7
R027
R028
R029
R70 10K
D9 D8 D7
R049
R050
R047
R075
D11 D12 D13 D14 D15
D16 D17 D18
R080 R081 R082 R083 R084
R057 C031 C030
R032 R044 R056 R045
SW1 CHANNEL SEARCH –
SW2 CHANNEL SEARCH +
SW3 RESET
SW5 SEARCH ON/OFF
SW4 AUTOMATIC PROGRAMMING
C029 C010 C012
D19
R063 R069 R013
R043 R076 R077 R078 R074
C033
CN6008 CN6009
R022 D10
ON OFF
SW7
ON OFF FINE
SW6

### CI-1 BOARD

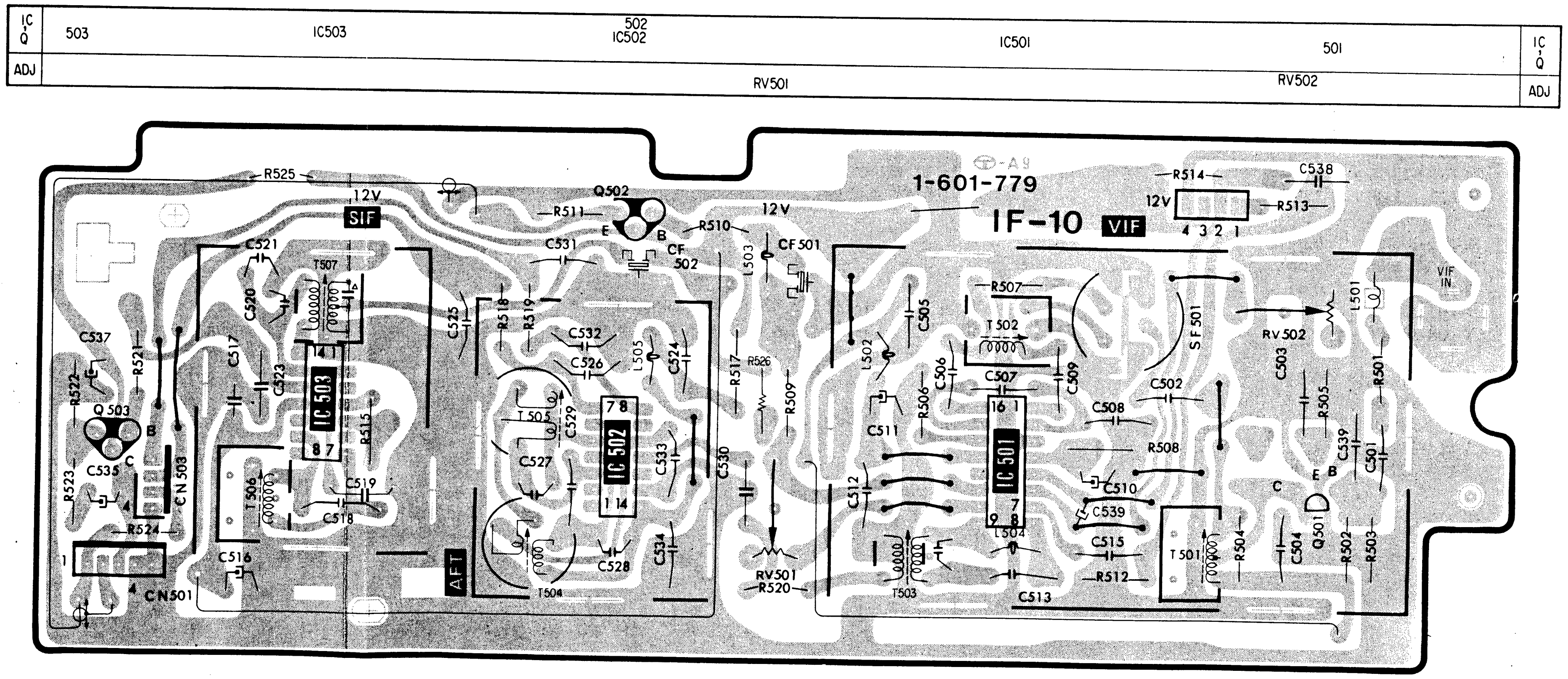

JAPAN
JW001
JW002
JW003
JW004
JW005
D020 CHANNEL INDICATOR
IC013
CN6010
CN6011
CN6012
SW 6 015
SW 5 014
SW 4 013
SW 3 012
SW 2 011
SW 1 010
SW 12 021
SW 11 020
SW 10 019
SW 9 018
SW 8 017
SW 7 016

### PC-1 BOARD


PC-1
JAPAN
C503
R503
R504
D501
RV501
CN501
C501
Q501
C502
Q502
R513
Q513
R510
Q510
Q512
R502
R501
CN502
R512
R514
R511
Q511

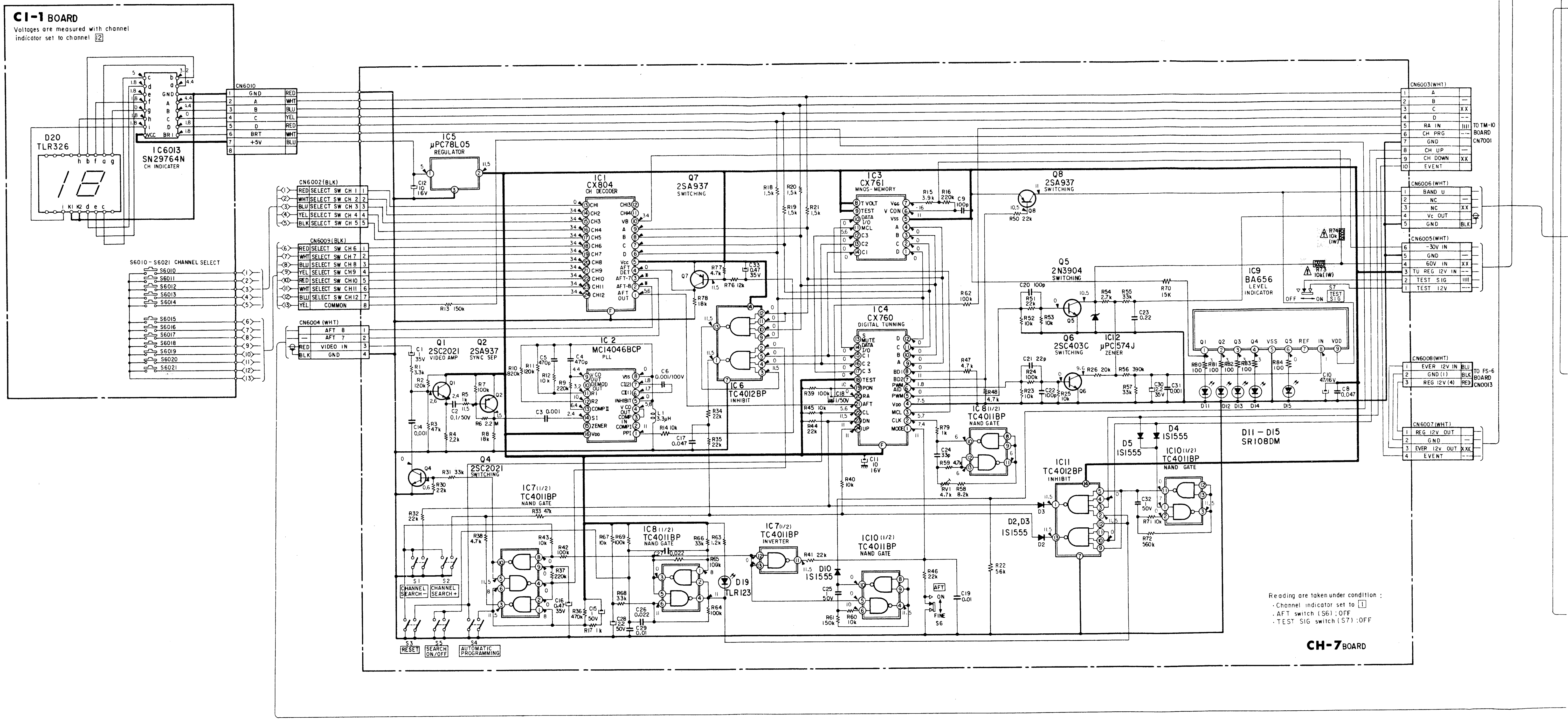

103 104
Q
D
ADJ
12V
D
Y X
CN107
C118
R117
R118
R119
C129
CN101
C136
C117
C119
R120
R121
R123
R124
R125
Q103
Q104
B C E
TU102 VHF
AGC 12V
AP
RF
UB VC AGC 12V
HF
TU101
R133
C135 C103 C104 C131 C130 C137
TU-11
1-601-778

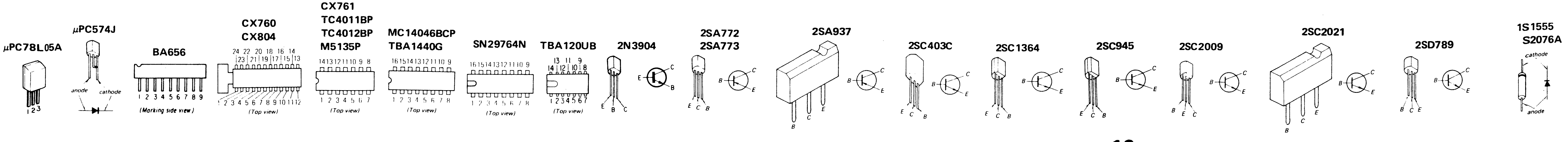
### IF-10 BOARD

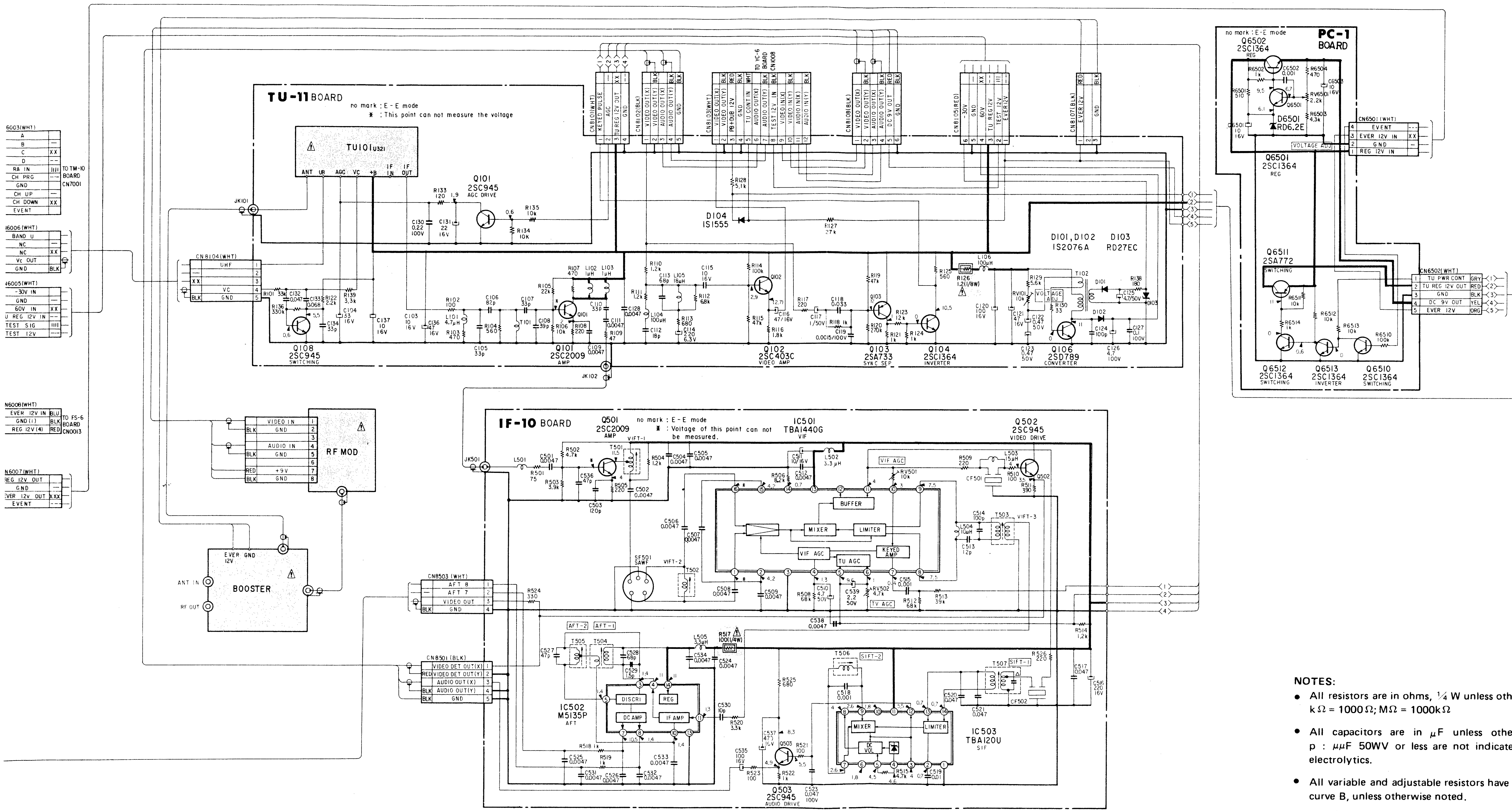

IC Q 503 IC503 502 IC502 IC501 501 IC Q
ADJ RV501 RV502 ADJ
1-601-779
IF-10 VIF
SIF
AFT
12V
R525
Q502
E B
R511
R510
CF502
CF501
C531
L503
R514
C538
R513
4 3 2 1
VIF IN
C521
C520
T507
C537
R522
R521
C517
C523
IC503
R515
Q503
C535
R523
R524
CN503
T506
C519
C518
C516
CN501
C525
R518
R519
C532
C526
L505
C524
T505
C529
C527
IC502
C533
C528
C534
T504
C530
R517
R526
R509
RV501
R520
C505
L502
R507
T502
C506
C507
C509
R506
C511
IC501
C508
C502
SF501
RV502
L501
C503
R505
R501
R508
C510
C539
C512
L504
T503
C515
R512
C513
T501
R504
C504
Q501
R502
R503
C501

## CH-7 (AUTO TUNING), CI-1 (CHANNEL INDICATOR), PC-1 (REG), TU-11 (TUNER) AND IF-10 (VIF, SIF, AFT) BOARDS SCHEMATIC DIAGRAM

– Ref. No. CH-7, CI-1 BOARDS: 6000 Series PC-1 BOARD: 6500 Series TU-11 BOARD: 8100 Series IF-10 BOARD: 8500 Series CHASSIS: 9500 Series –


CI-1 BOARD
Voltages are measured with channel indicator set to channel 12
D20
TLR326
IC6013
SN29764N
CH INDICATER
CN6010
GND
A
B
C
D
BRT
+5V
CN6002(BLK)
SELECT SW CH 1
SELECT SW CH 2
SELECT SW CH 3
SELECT SW CH 4
SELECT SW CH 5
CN6009(BLK)
SELECT SW CH 6
SELECT SW CH 7
SELECT SW CH 8
SELECT SW CH 9
SELECT SW CH 10
SELECT SW CH 11
SELECT SW CH 12
COMMON
S6010 – S6021 CHANNEL SELECT
CN6004 (WHT)
AFT 8
AFT 7
VIDEO IN
GND
IC5
μPC78L05
REGULATOR
IC1
CX804
CH DECODER
Q7
2SA937
SWITCHING
IC3
CX761
MNOS-MEMORY
Q8
2SA937
SWITCHING
CN6003(WHT)
RA IN
CH PRG
CH UP
CH DOWN
EVENT
TO TM-10 BOARD CN7001
CN6006(WHT)
BAND U
NC
Vc OUT
CN6005(WHT)
-30V IN
60V IN
TU REG 12V IN
TEST SIG
TEST 12V
Q5
2N3904
SWITCHING
IC9
BA656
LEVEL INDICATOR
S7
TEST SIG
OFF
ON
R73 10k(1W)
R74 10k (1W)
Q1
2SC2021
VIDEO AMP
Q2
2SA937
SYNC SEP
IC 2
MC14046BCP
PLL
IC6
TC4012BP
INHIBIT
IC4
CX760
DIGITAL TUNNING
Q6
2SC403C
SWITCHING
IC12
μPC574J
ZENER
CN6008(WHT)
EVER 12V IN
GND(1)
REG 12V (4)
TO FS-6 BOARD CN0013
CN6007(WHT)
REG 12V OUT
GND
EVER 12V OUT
EVENT
D11
D12
D13
D14
D15
D11 – D15
SR108DM
IC 8 (1/2)
TC4011BP
NAND GATE
D5
1S1555
D4
1S1555
IC11
TC4012BP
INHIBIT
IC10 (1/2)
TC4011BP
NAND GATE
Q4
2SC2021
SWITCHING
IC7 (1/2)
TC4011BP
NAND GATE
IC8 (1/2)
TC4011BP
NAND GATE
IC7 (1/2)
TC4011BP
INVERTER
D10
1S1555
D19
TLR123
IC10 (1/2)
TC4011BP
NAND GATE
D2, D3
1S1555
AFT
ON
FINE
S6
S1
CHANNEL SEARCH –
S2
CHANNEL SEARCH +
S3
RESET
S5
SEARCH ON/OFF
S4
AUTOMATIC PROGRAMMING
Reading are taken under condition :
· Channel indicator set to 1
· AFT switch (S6) : OFF
· TEST SIG switch (S7) : OFF
CH-7 BOARD


μPC78L05A
μPC574J
anode
cathode
BA656
(Marking side view)
CX760
CX804
(Top view)
CX761
TC4011BP
TC4012BP
M5135P
(Top view)
MC14046BCP
TBA1440G
(Top view)
SN29764N
(Top view)
TBA120UB
(Top view)
2N3904
2SA772
2SA773
2SA937
2SC403C
2SC1364
2SC945
2SC2009
2SC2021
2SD789
1S1555
S2076A
cathode
anode
E
B
C

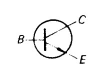

TU-11 BOARD
no mark : E-E mode
* : This point can not measure the voltage
TU101 U321
ANT UB AGC VC +B IF IN IF OUT
Q101 2SC945 AGC DRIVE
JK101
D104 1S1555
D101, D102 1S2076A
D103 RD27EC
Q108 2SC945 SWITCHING
Q101 2SC2009 AMP
Q102 2SC403C VIDEO AMP
Q103 2SA733 SYNC SEP
Q104 2SC1364 INVERTER
Q106 2SD789 CONVERTER
JK102
CN8104(WHT)
CN8101(WHT)
CN8102(BLK)
CN8103(WHT)
CN8108(BLK)
CN8105(RED)
CN8107(BLK)
TO VC-6 BOARD CN1008
6003(WHT)
TO TM-10 BOARD CN7001
6006(WHT)
6005(WHT)
N6008(WHT)
TO FS-6 BOARD CN0013
N6007(WHT)
RF MOD
BOOSTER
ANT IN
RF OUT
EVER 12V
GND
IF-10 BOARD
no mark : E-E mode
* : Voltage of this point can not be measured.
Q501 2SC2009 AMP
IC501 TBA1440G VIF
Q502 2SC945 VIDEO DRIVE
JK501
BUFFER
MIXER
LIMITER
KEYED AMP
VIF AGC
TU AGC
SF501 SAWF
CN8503(WHT)
CN8501(BLK)
IC502 M5135P AFT
DISCRI
REG
DC AMP
IF AMP
Q503 2SC945 AUDIO DRIVE
IC503 TBA120U SIF
DC VOL
PC-1 BOARD
no mark : E-E mode
Q6502 2SC1364 REG
D6501 RD6.2E
Q6501 2SC1364 REG
Q6511 2SA772 SWITCHING
Q6512 2SC1364 SWITCHING
Q6513 2SC1364 INVERTER
Q6510 2SC1364 SWITCHING
CN6501(WHT)
EVENT
EVER 12V IN
GND
REG 12V IN
VOLTAGE ADJ
CN6502(WHT)
TU PWR CONT
TU REG 12V OUT
GND
DC 9V OUT
EVER 12V

**NOTES:**

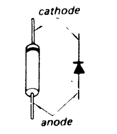
- All resistors are in ohms, ¼ W unless otherwise noted. kΩ = 1000 Ω; MΩ = 1000kΩ
- All capacitors are in μF unless otherwise noted. p : μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ⊡ : nonflammable resistor.
- The red lines show the main voltages.
- All voltages are dc measured with a VOM (20kΩ/V).

**The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.**

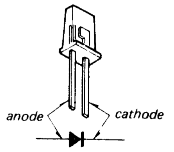
**SD789**



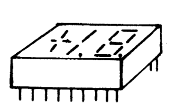
**1S1555**
**S2076A**


cathode
anode

**SR108DM**


anode
cathode

**TLR326**



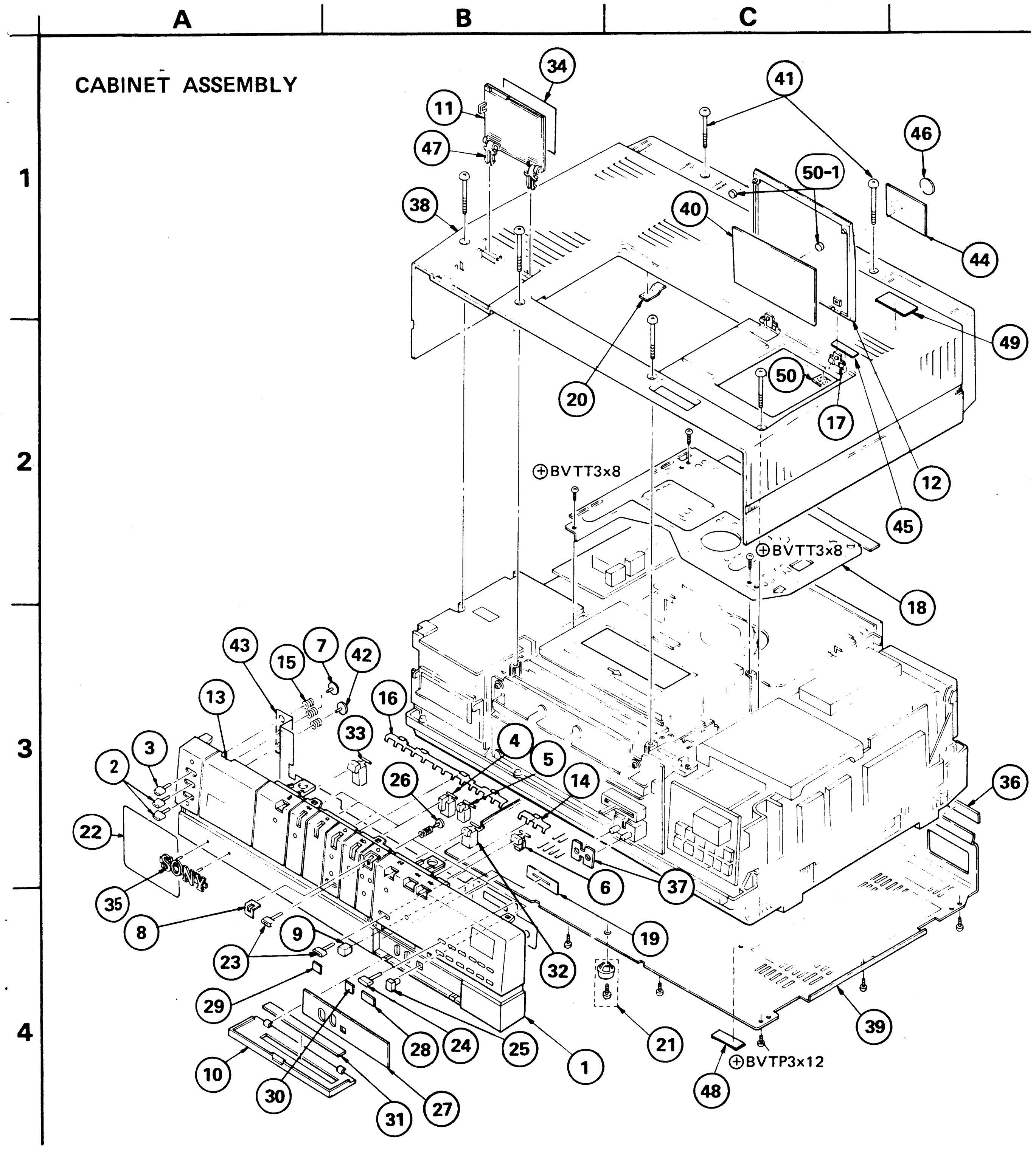
## 4. EXPLODED VIEWS

**Note:**

**The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.**

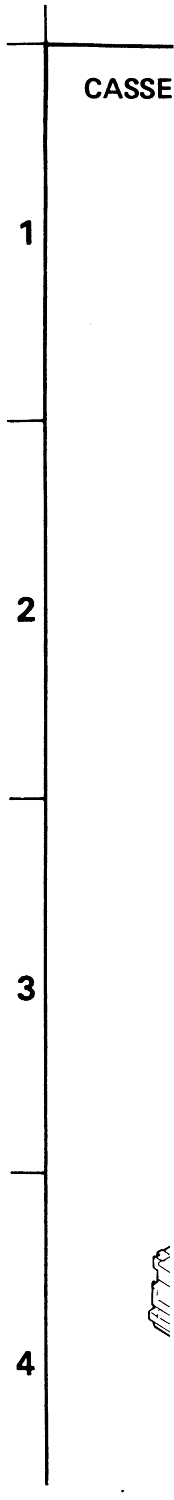
- Items with no part number and no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
- As to the part numbered with E-, refer to the electrical parts list.
- Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The construction parts of an assembled part are indicated with a collation number in the remark column.

### CABINET ASSEMBLY



| No. | Part No. | Description | Remark |
|---|---|---|---|
| 1 | A-6703-062-A | PANEL ASS'Y, front – – – – – | 2–8, 11<br>13–16, 19<br>22–33, 35<br>42, 43 |
| 2 | 3-659-535-01 | SWITCH, P | |
| 3 | 3-659-535-11 | | |
| 4 | 3-659-537-00 | BUTTON (2), F | |
| 5 | 3-659-538-00 | BUTTON (3), F | |
| 6 | 3-659-539-00 | BUTTON (4), F | |
| 7 | 3-659-542-00 | RETAINER, spring | |
| 8 | 3-659-543-00 | PLATE, ornamental; REC button | |
| 9 | 3-659-547-00 | KNOB, control | |
| 10 | 3-659-589-00 | DOOR, front | |
| 11 | 3-659-590-00 | LID, timer | |
| 12 | 3-659-599-21 | DOOR, preset | |
| 13 | 3-659-606-11 | WINDOW, timer | |
| 14 | 3-659-607-00 | RETAINER (2), button | |
| 15 | 3-659-609-00 | SPRING, compression | |
| 16 | 3-659-616-00 | RETAINER (1), button | |
| 17 | 3-659-618-00 | HINGE, spring | |
| 18 | ♦3-659-671-00 | COVER, shield | |
| 19 | 3-659-746-00 | CLOTH, masking; VR | |
| 20 | 3-659-748-00 | CLOTH, masking; upper case | |
| 21 | 3-659-768-00 | FOOT | |
| 22 | 3-660-901-00 | COVER, front; timer | |
| 23 | 3-662-211-00 | BUTTON, SF | |
| 24 | 3-662-212-00 | BUTTON, tuning | |
| 25 | 3-662-213-00 | BUTTON, DUB | |
| 26 | 3-662-214-00 | RETAINER (2), spring | |
| 27 | 3-662-217-00 | INDICATOR | |
| 28 | 3-662-218-00 | PLATE, indication; DUB | |
| 29 | 3-662-219-00 | PLATE, indication; STILL | |
| 30 | 3-662-220-00 | PLATE, indication; SLOW | |
| 31 | 3-662-236-00 | LABEL (E), front door | |
| 32 | 3-662-247-00 | BUTTON (PAUSE), F | |
| 33 | 3-662-248-00 | BUTTON (EJECT), F | |
| 34 | 3-662-252-00 | STICKER (E), timer | |
| 35 | 3-662-253-00 | EMBLEM, SONY | |
| 36 | 3-662-260-00 | LABEL, input/output | |
| 37 | 3-662-269-00 | CLOTH, masking; switch | |
| 38 | 3-662-292-21 | CASE, upper | |
| 39 | 3-662-293-00 | PLATE, bottom | |
| 40 | 3-662-321-00 | LABEL, preset manual | |
| 41 | 3-662-325-00 | SCREW, tap | |
| 42 | 3-662-339-00 | RETAINER (3), spring | |
| 43 | 3-662-340-00 | PLATE (F), shield | |
| 44 | ♦3-662-343-00 | LABEL, model number | |
| 45 | 3-701-690-00 | LABEL, made in JAPAN | |
| 46 | 3-701-940-01 | LABEL, BEAB (UK model) | |
| 47 | 3-703-035-11 | SHAFT, LTD | |
| 48 | 3-703-043-21 | LABEL, caution main | |
| 49 | 3-703-082-21 | LABEL, caution | |
| 50 | 3-831-441-XX | CLOTH (2), masking; upper case | |
| 50-1 | 4-314-871-00 | CUSHION | |

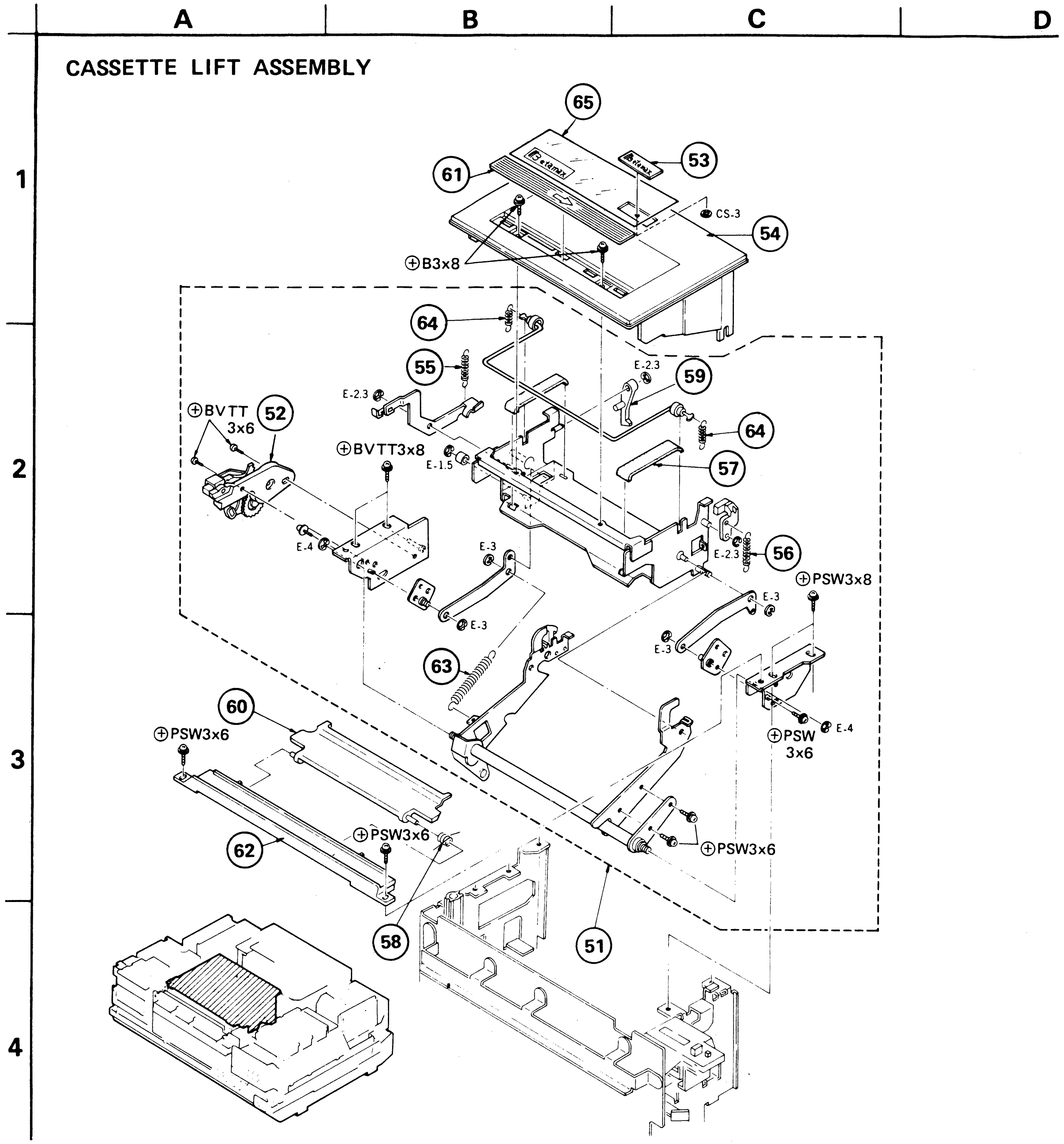
CASSE



| No. | Part |
|---|---|
| 51 | A-67 |
| 52 | A-67 |
| 53 | X-36 |
| 54 | X-36 |
| 55 | 3-53 |
| 56 | 3-64 |
| 57 | 3-65 |

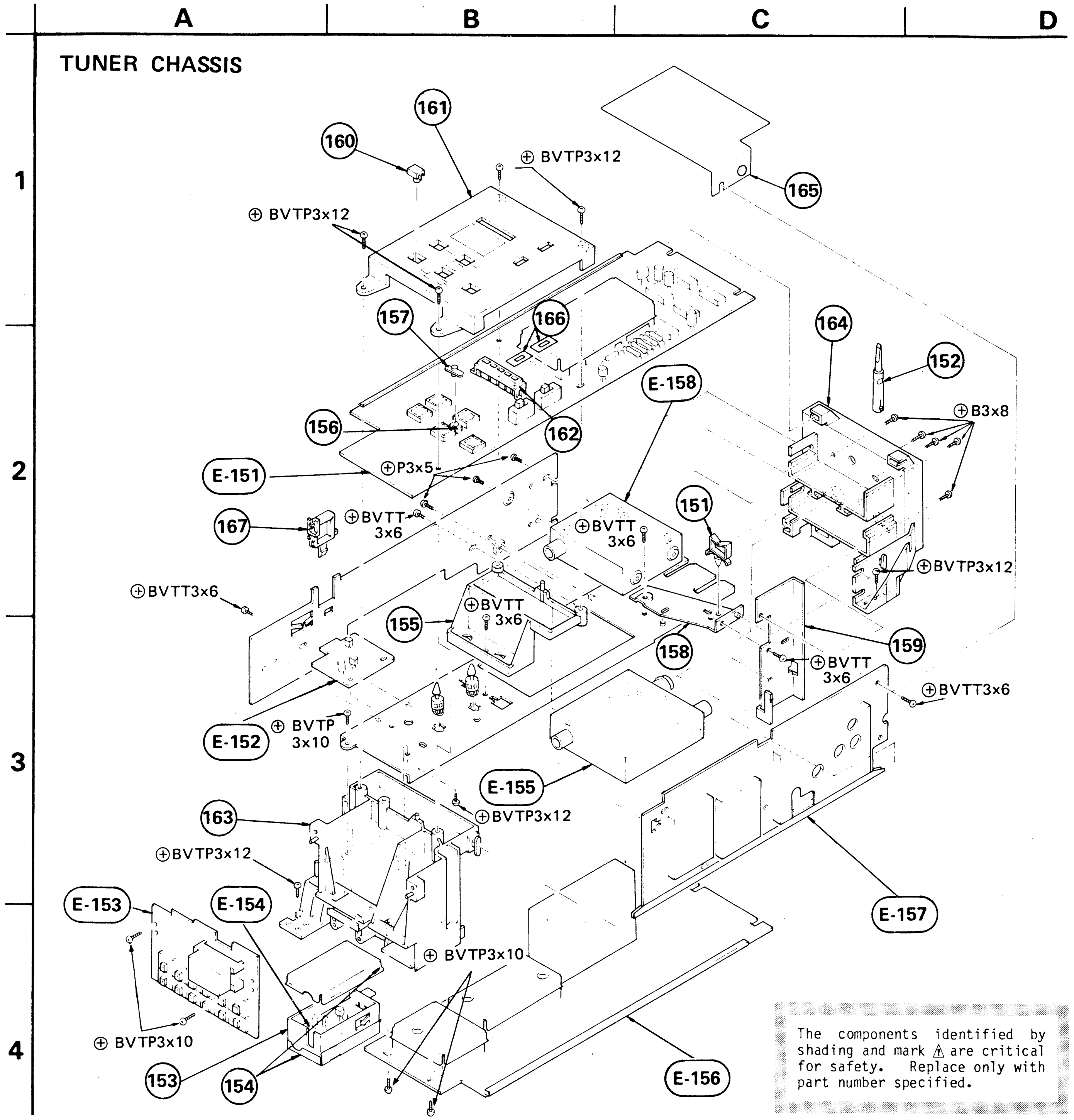
*emark*

## CASSETTE LIFT ASSEMBLY


A
B
C
D
1
2
3
4
65
61
53
54
CS-3
⊕B3x8
64
55
59
E-2.3
64
57
⊕BVTT 3x6
52
⊕BVTT3x8
E-1.5
E-4
E-3
56
E-2.3
⊕PSW3x8
63
E-3
E-4
⊕PSW 3x6
60
⊕PSW3x6
62
⊕PSW3x6
⊕PSW3x6
58
51

| No. | Part No. | Description | Remark |
|---|---|---|---|
| 51 | A-6751-061-A | CASSETTE-UP BLOCK ASS'Y | 52, 55–57, 59, 63, 64 |
| 52 | A-6751-079-A | DAMPER ASS'Y | |
| 53 | X-3658-101-0 | EMBLEM ASS'Y (P) | |
| 54 | X-3662-221-0 | LID ASS'Y, cassette-up | 53, 65 |
| 55 | 3-534-274-XX | SPRING, tension | |
| 56 | 3-642-490-00 | SPRING, tension | |
| 57 | 3-659-498-00 | CUSHION, cassette holder | |
| 58 | 3-659-531-00 | SPRING | |
| 59 | 3-659-579-00 | LEVER, release lid lock | |
| 60 | 3-659-583-00 | PLATE, blind cassette | |
| 61 | 3-659-585-00 | STRIP, ornamental cassette | |
| 62 | 3-659-598-21 | GUIDE, cassette | |
| 63 | 3-659-635-00 | SPRING, tension | |
| 64 | 3-659-636-00 | SPRING, tension | |
| 65 | 3-662-342-00 | STICKER, C7UB | |

## TUNER CHASSIS

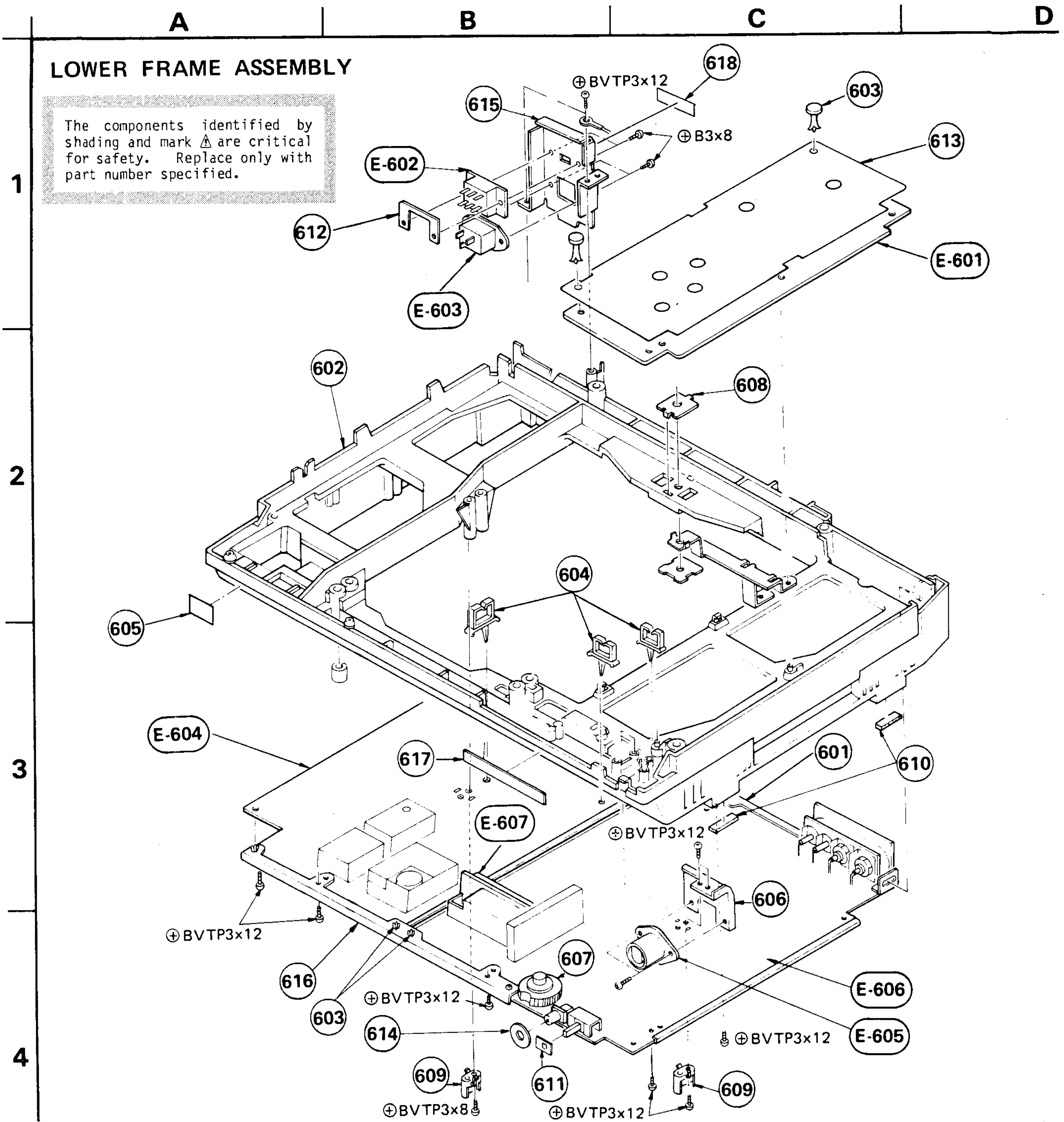

A
B
C
D
1
2
3
4
161
160
⊕ BVTP3x12
165
⊕ BVTP3x12
157
166
164
152
⊕B3x8
E-158
156
162
E-151
⊕P3x5
151
167
⊕BVTT 3x6
⊕BVTT 3x6
⊕BVTP3x12
⊕BVTT3x6
155
⊕BVTT 3x6
158
159
⊕BVTT 3x6
⊕BVTT3x6
E-152
⊕ BVTP 3x10
E-155
⊕BVTP3x12
163
⊕BVTP3x12
E-153
E-154
⊕ BVTP3x10
E-157
⊕ BVTP3x10
153
154
E-156

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

| No. | Part No. | Description | Remark |
|---|---|---|---|
| 151 | ♠3-655-214-00 | CLIP, cable | |
| 152 | 3-656-301-00 | SCREWDRIVER, control | |
| 153 | ♠3-662-215-00 | CASE, shield | |
| 154 | ♠3-662-216-00 | LID, shield case | |
| 155 | ♠3-662-226-00 | RETAINER, preset | |
| 156 | ♠3-662-228-00 | HOLDER (R-1), LED | |
| 157 | 3-662-229-00 | COVER, (L-1), lamp | |
| 158 | ♠3-662-234-00 | REINFORCEMENT, IF | |
| 159 | ♠3-662-242-00 | BRACKET, IF | |
| 160 | 3-662-243-00 | BUTTON, preset | |
| 161 | 3-662-281-00 | PLATE, ornamental; preset | |
| 162 | 3-662-282-00 | ESCUTCHEON, 5 gang LED | |
| 163 | ♠3-662-288-00 | CHASSIS (F), tuner | |
| 164 | 3-662-289-00 | CHASSIS (B), tuner | |
| 165 | ♠3-662-324-00 | PLATE, shield; TU | |
| 166 | 3-831-441-XX | CLOTH, masking | |
| 167 | ♠4-316-015-00 | HOLDER, wire | |
| E-151 | ♠A-6725-154-A | CH-3 Board, complete | |
| E-152 | ♠1-601-835-00 | PC-1 Board | |
| E-153 | ♠1-601-831-00 | CI-1 Board | |
| E-154 | ♠1-601-834-00 | IR-1 Board | |
| ⚠E-155 | 1-463-296-00 | Antenna booster BT-971 | |
| E-156 | ♠A-6721-037-A | TU-11 Board, complete | |
| E-157 | ♠A-6721-038-A | IF-10 Board, complete | |
| ⚠E-158 | 1-464-105-00 | RF Modulator | |

## LOWER FRAME ASSEMBLY

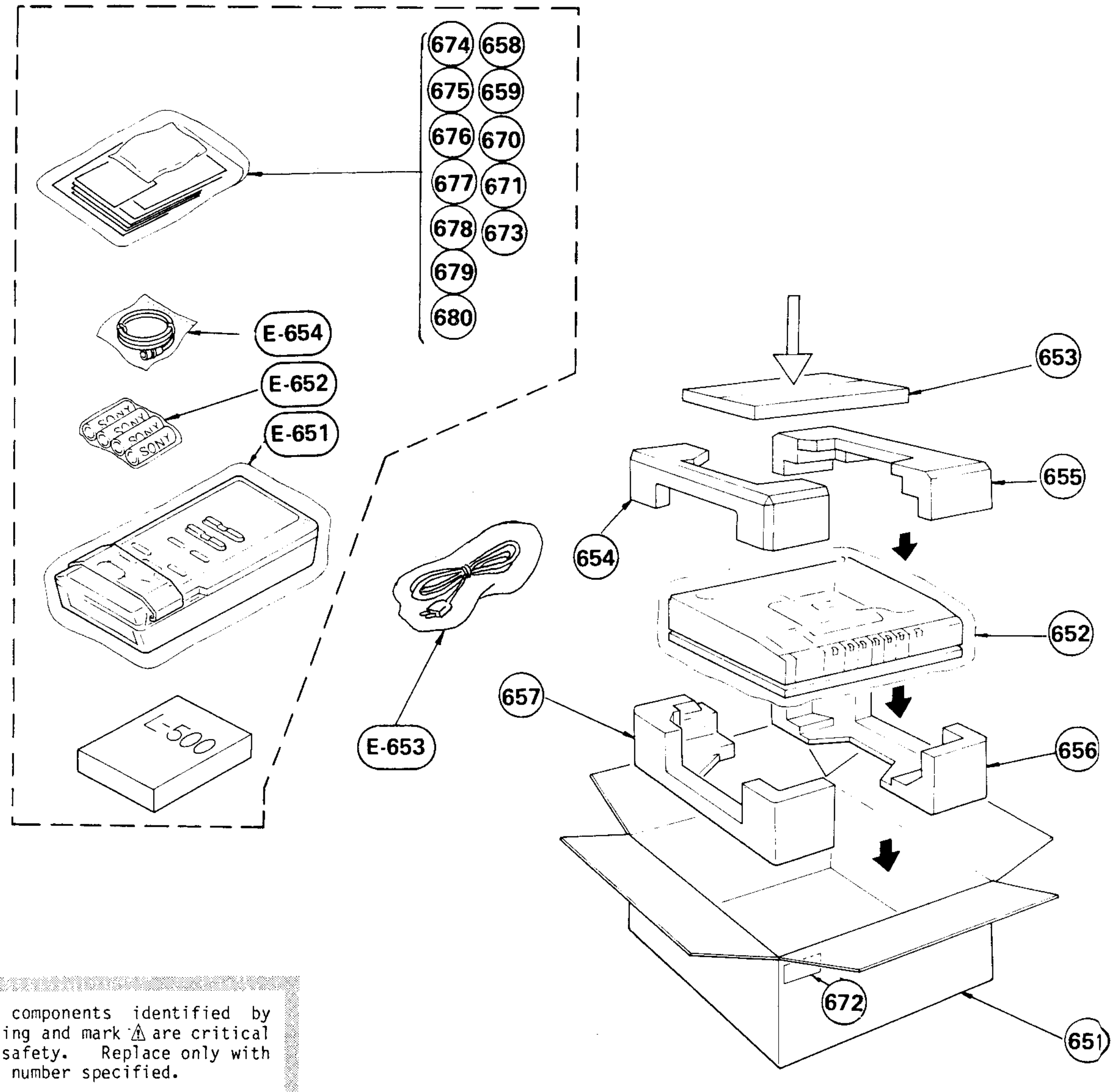
The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.


A
B
C
D
1
2
3
4
⊕BVTP3x12
618
603
615
⊕B3x8
613
E-602
612
E-601
E-603
602
608
604
605
E-604
617
601
610
E-607
⊕BVTP3x12
606
⊕BVTP3x12
607
616
E-606
⊕BVTP3x12
603
614
E-605
⊕BVTP3x12
609
611
609
⊕BVTP3x8
⊕BVTP3x12

| No. | Part No. | Description | Remark |
|---|---|---|---|
| 601 | X-3662-208-0 | BRACKET (A) ASS'Y, chassis | |
| 602 | X-3662-211-0 | FRAME ASS'Y, lower_ _ _ _ _ _ _ | 605, 617 |
| 603 | 3-646-090-00 | RIVET, nylon | |
| 604 | ● 3-655-214-00 | CLIP, cable | |
| 605 | 3-656-344-00 | LABEL, power switch | |
| 606 | ● 3-659-522-00 | BRACKET, camera connector | |
| 607 | 3-659-528-00 | KNOB, track control | |
| 608 | ● 3-659-529-00 | SPACER, plate | |
| 609 | 3-659-530-00 | BLOCK, support; bottom plate | |
| 610 | 3-659-532-00 | FELT, foot | |
| 611 | 3-659-663-00 | COVER, slide switch | |
| 612 | ● 3-662-235-00 | NUT, plate | |
| 613 | ● 3-662-244-00 | INSULATOR | |

| No. | Part No. | Description | Remark |
|---|---|---|---|
| 614 | 3-662-261-00 | COVER, microphone jack | |
| 615 | 3-662-273-00 | PANEL (E), power | |
| 616 | ● 3-662-279-00 | BRACKET (B), chassis | |
| 617 | 3-662-280-00 | LABEL, input | |
| 618 | ● 3-701-961-01 | CAUTION (B), UK ground | |
| E-601 | ● A-6711-217-A | CR-4 Board, complete | |
| ⚠ E-602 | 1-553-125-00 | Slide, VOLTAGE SELECTOR | S9 505 |
| ⚠ E-603 | 1-509-546-00 | 3P INLET | |
| E-604 | ● A-6715-093-A | AS-3 Board, complete | |
| E-605 | ● 1-561-263-00 | CONNECTOR, CAMERA | CN9501 |
| E-606 | ● A-6711-215-A | YC-6 Board, complete | |
| E-607 | ● 1-601-836-00 | CB-1 Board | |

## PACKING


A
B
C
D
1
2
3
674
675
676
677
678
679
680
658
659
670
671
673
E-654
E-652
E-651
SONY
L-500
E-653
653
655
654
652
657
656
672
651

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

| *No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| 651 | X-3662-220-0 | INDIVIDUAL CARTON ASS'Y | |
| 652 | 3-656-390-00 | BAG, protection | |
| 653 | 3-662-327-00 | CASE, accessory | |
| 654 | 3-662-328-00 | CUSHION, left upper | |
| 655 | 3-662-329-00 | CUSHION, right upper | |
| 656 | 3-662-330-00 | CUSHION, right lower | |
| 657 | 3-662-331-00 | CUSHION, left lower | |

| *No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| 658 | 3-701-630-00 | BAG, polyethylene | |
| 659 | 3-783-172-41 | MANUAL, instruction | |
| 670 | 3-794-605-11 | MANUAL, instant information | |
| 671 | 3-794-812-41 | MANUAL, instant information | |
| E-651 | A-6701-071-A | COMMANDER ASS'Y, remote | |
| E-652 | 1-528-027-11 | BATTERY, long-life; SUM-3 | |
| ⚠E-653 | 1-534-819-00 | CORD, power (UK model) | |
| ⚠E-653 | 1-551-646-00 | CORD, power (HK model) | |
| E-654 | 1-551-513-00 | CABLE, coaxial ass'y | |

# SL-C7UB

# SERVICE MANUAL

No. 2
July, 1981

## SUPPLEMENT

SUBJECT: Addition of silver metallic color case

File this supplement with the service manual.

| Part Name | Part No. | |
|---|---|---|
| | Dark Gray Color Case | Silver Metallic Color Case |
| PANEL ASS'Y, front | A-6703-062-A | A-6703-186-A |
| DOOR, front | 3-659-589-21 | 3-659-589-63 |
| CASE, upper | 3-662-292-21 | 3-669-001-61 |
| DOOR, preset | 3-659-599-21 | 3-659-599-91 |
| LID ASS'Y, cassette-up | X-3662-221-0 | X-3662-255-0 |
| EMBLEM ASS'Y (P) (X-3658-101-0) | 3-703-471-00 | 3-703-471-00 |
| COVER ASS'Y, counter | X-3662-205-0 | X-3664-306-0 |
| COMMANDER ASS'Y, remote | A-6701-071-A | A-6701-174-A |
| CASE (UPPER) ASS'Y | X-3662-213-0 | X-3662-249-0 |
| INDIVIDUAL CARTON ASS'Y (X-3662-226-0) | 3-662-387-00 | 3-662-386-00 |

**Note:** Part Numbers of emblem ass'y (P) and individual carton ass'y of dark gray color case are changed as above.

## VIDEOCASSETTE RECORDER

SONY®

Betamax

VIDEOCASSETTE RECORDER

# SL-C7UB

No.1
October, 1980

# SUPPLEMENT

Subject; CH-7 Board Change

This supplement includes production changes starting with Serial No. 235001 and later.

**Note:** HK model has been changed with Serial No. 202001 and later.

File this supplement with the service manual.

## 1. INTRODUCTION

The CH-7 board has been changed into the CH-16 board.

## 2. INTERCHANGEABILITY

The former and new circuit boards are interchangeable.

## 3. CHANGED PARTS LIST

The CH-16 board parts list is shown on page 5.

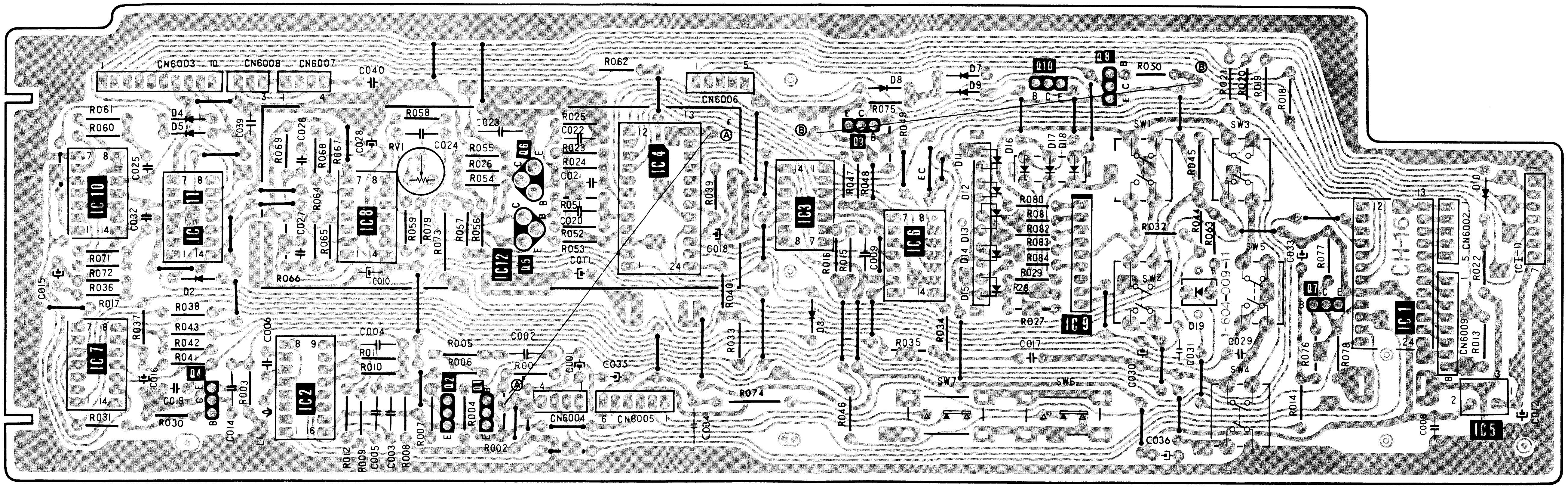
SONY®
SERVICE MANUAL

## CH-16 (AUTO TUNING) PRINTED WIRING BOARD

– Ref. No. 6000 series –

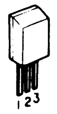
| | | |
|---|---|---|
| Q, IC | IC10 IC7 IC11 4 IC2 IC8 2 IC12 1 6 5 IC4 IC3 9 IC6 10 IC9 8 7 IC1 IC5 | Q, IC |
| D | 4 5 2 3 8 7 9 11, 13, 15 12 14 16 17 18 19 10 | D |
| ADJ | RV1 | ADJ |

### CH-16 BOARD

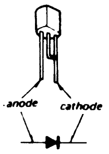


CN6003
CN6008
CN6007
CN6006
CN6004
CN6005
CN6002
CN6009
C040
R062
R061
R060
D4
D5
C039
R069
C026
R068
R067
C028
R058
RV1
C024
C023
R055
R026
R054
R025
C022
R023
R024
C021
R051
C020
R052
R053
C011
IC10
IC11
IC8
IC12
IC4
IC3
IC6
IC9
IC1
IC7
IC2
IC5
Q1
Q2
Q4
Q5
Q6
Q7
Q8
Q9
Q10
C025
C032
R064
C027
R065
R066
R059
R079
R073
R057
R056
C010
R039
C018
R040
R033
R071
R072
R036
R017
D2
C015
R037
R038
R043
R042
R041
C016
C019
C014
R003
R031
R030
C006
C004
R011
R010
R005
R006
C002
R001
C001
C035
R004
R007
R002
R012
R009
C005
C003
R008
C034
R074
D3
D7
D8
D9
D10
D11
D12
D13
D14
D15
D16
D17
D18
D19
R075
R049
R047
R048
R016
R015
C009
R034
R035
R046
SW1
SW2
SW3
SW4
SW5
SW6
SW7
R050
R021
R020
R019
R018
R045
R080
R081
R082
R083
R084
R029
R28
R027
R032
R044
R063
C017
C030
C031
C029
C033
R077
R076
R078
R014
C036
R022
R013
C008
C012
1-604-009-11
CH-16
Ⓐ
Ⓑ

**µPC78L05A**

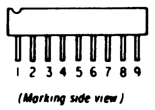


**µPC574J**



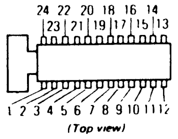
anode
cathode

**BA656**



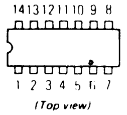
1 2 3 4 5 6 7 8 9
(Marking side view)

**CX7915**
**CX804**



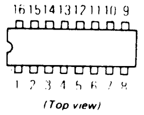
24 22 20 18 16 14
23 21 19 17 15 13
1 2 3 4 5 6 7 8 9 10 11 12
(Top view)

**CX761**
**TC4011BP**
**TC4012BP**
**M5135P**



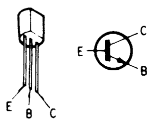
14 13 12 11 10 9 8
1 2 3 4 5 6 7
(Top view)

**MC14046BCP**
**TBA1440G**

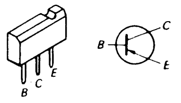


16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8
(Top view)

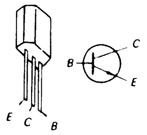
**2N3904**



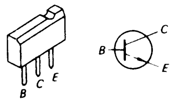
**2SA937**



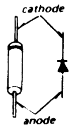
**2SC403C**



**2SC2021**

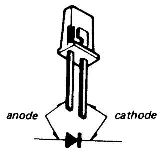


**1S1555**
**S2076A**



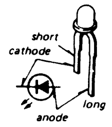
cathode
anode

**SR108DM**



anode
cathode

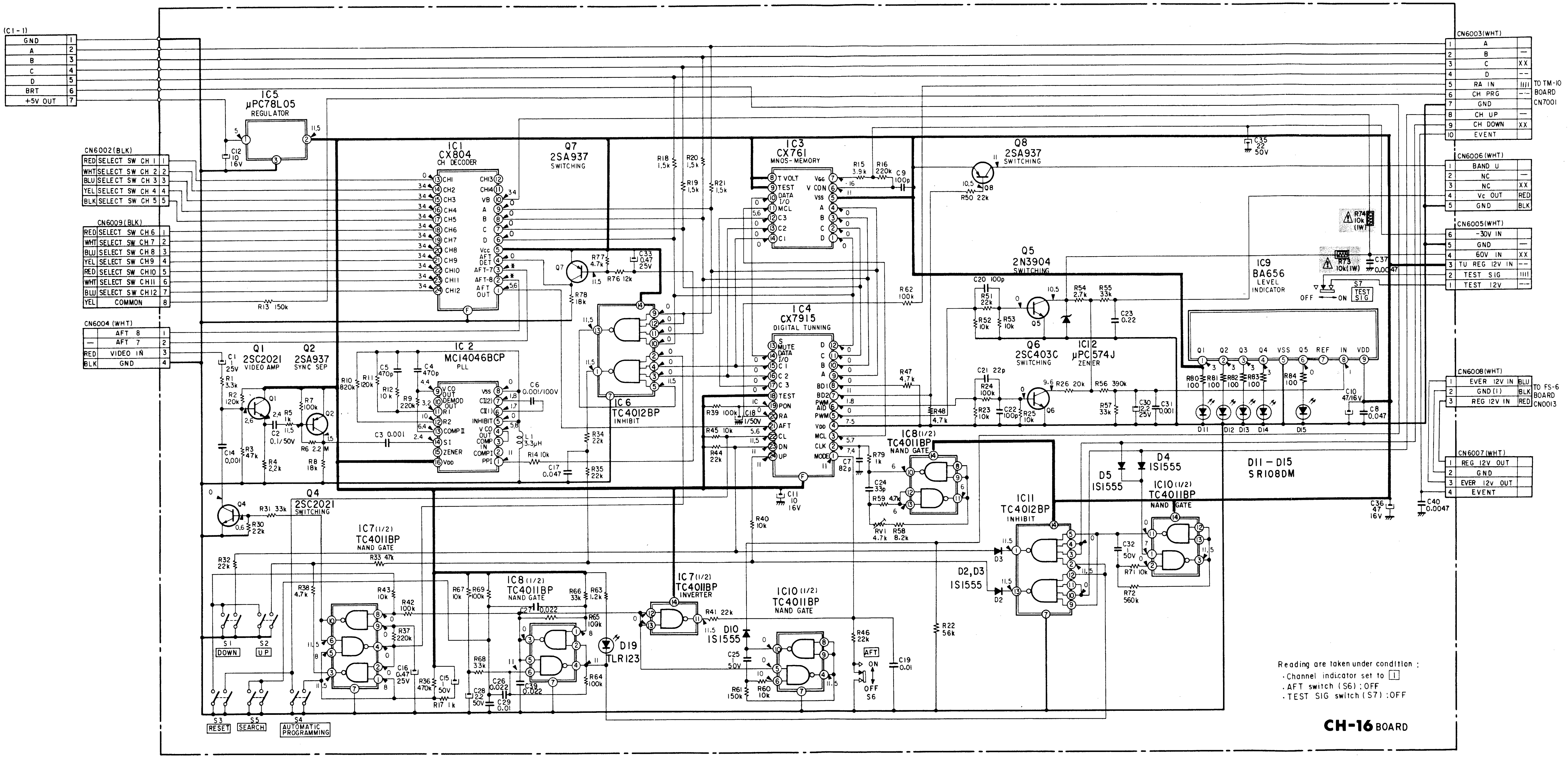
**TLG123**
**TLR123**
**TLY123**



short
cathode
anode
long

## CH-16 (AUTO TUNING) BOARD SCHEMATIC DIAGRAM

– Ref. No. 6000 series –


IC5 μPC78L05 REGULATOR
IC1 CX804 CH DECODER
Q7 2SA937 SWITCHING
IC3 CX761 MNOS-MEMORY
Q8 2SA937 SWITCHING
IC 2 MC14046BCP PLL
IC4 CX7915 DIGITAL TUNNING
Q5 2N3904 SWITCHING
Q6 2SC403C SWITCHING
IC12 μPC574J ZENER
IC9 BA656 LEVEL INDICATOR
Q1 2SC2021 VIDEO AMP
Q2 2SA937 SYNC SEP
IC6 TC4012BP INHIBIT
IC8(1/2) TC4011BP NAND GATE
Q4 2SC2021 SWITCHING
IC7(1/2) TC4011BP NAND GATE
IC8(1/2) TC4011BP NAND GATE
IC7(1/2) TC4011BP INVERTER
IC10(1/2) TC4011BP NAND GATE
IC11 TC4012BP INHIBIT
IC10(1/2) TC4011BP NAND GATE
D4 1S1555
D5 1S1555
D2,D3 1S1555
D10 1S1555
D19 TLR123
D11 – D15 SR108DM
S1 DOWN
S2 UP
S3 RESET
S5 SEARCH
S4 AUTOMATIC PROGRAMMING
S6 AFT ON OFF
S7 OFF ON TEST SIG
(C1-1) GND 1, A 2, B 3, C 4, D 5, BRT 6, +5V OUT 7
CN6002(BLK) SELECT SW CH 1–5
CN6009(BLK) SELECT SW CH 6–12, COMMON
CN6004(WHT) AFT 8, AFT 7, VIDEO IN, GND
CN6003(WHT) A, B, C, D, RA IN, CH PRG, GND, CH UP, CH DOWN, EVENT — TO TM-10 BOARD CN7001
CN6006(WHT) BAND U, NC, NC, Vc OUT, GND
CN6005(WHT) -30V IN, GND, 60V IN, TU REG 12V IN, TEST SIG, TEST 12V
CN6008(WHT) EVER 12V IN, GND(1), REG 12V IN — TO FS-6 BOARD CN0013
CN6007(WHT) REG 12V OUT, GND, EVER 12V OUT, EVENT
Reading are taken under condition :
· Channel indicator set to 1
· AFT switch (S6) : OFF
· TEST SIG switch (S7) : OFF
CH-16 BOARD

**The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.**

NOTES:

- All resistors are in ohms, ¼ W unless otherwise noted. kΩ = 1000Ω; MΩ = 1000kΩ
- All capacitors are in μF unless otherwise noted. p : μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ▭ : nonflammable resistor.
- The red lines show the main voltages.
- All voltages are dc measured with a VOM (20kΩ/V).

## CH-16 BOARD ELECTRICAL PARTS LIST

### CH-16 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ● | A-6725-216-A | CH-16 Board, Complete | |
| C1 | 1-127-453-00 | 1. 25V elect | |
| C2 | 1-108-251-00 | 0.1 mylar | |
| C3 | 1-161-323-00 | 0.001 | |
| C4, 5 | 1-161-319-00 | 470p | |
| C6 | 1-108-365-00 | 0.001 100V mylar | |
| C7 | 1-102-974-00 | 82P | |
| C8 | 1-161-021-00 | 0.047 | |
| C9 | 1-161-271-00 | 100p | |
| C10 | 1-123-319-00 | 47 16V elect | |
| C11, 12 | 1-123-316-00 | 10 16V elect | |
| C14 | 1-161-323-00 | 0.001 | |
| C15 | 1-123-352-00 | 1 50V elect | |
| C16 | 1-127-451-00 | 0.47 25V elect | |
| C17 | 1-161-021-00 | 0.047 | |
| C18 | 1-123-352-00 | 1 50V elect | |
| C19 | 1-161-013-00 | 0.01 | |
| C20 | 1-161-271-00 | 100p | |
| C21 | 1-161-263-00 | 22p | |
| C22 | 1-161-271-00 | 100p | |
| C23 | 1-108-820-00 | 0.22 mylar | |
| C24 | 1-161-265-00 | 33p | |
| C25 | 1-123-228-00 | 1 50V elect | |
| C26, 27 | 1-161-223-00 | 0.022 | |
| C28 | 1-123-353-00 | 2.2 50V elect | |
| C29 | 1-161-013-00 | 0.01 | |
| C30 | 1-123-612-00 | 2.2 50V elect | |
| C31 | 1-161-323-00 | 0.001 | |
| C32 | 1-123-228-00 | 1 50V elect | |
| C33 | 1-127-451-00 | 0.47 25V elect | |
| C34 | 1-108-653-00 | 0.0047 100V mylar | |
| C35 | 1-123-357-00 | 22 50V elect | |
| C36 | 1-123-319-00 | 47 16V elect | |
| C39 | 1-161-017-00 | 0.022 | |
| C40 | 1-102-125-00 | 0.0047 | |
| ●CN2 | 1-508-735-21 | 5p Connector | |
| ●CN3 | 1-508-736-00 | 10p Connector | |
| ●CN4 | 1-508-847-00 | 4p Connector | |
| ●CN5 | 1-508-848-00 | 6p Connector | |
| ●CN6 | 1-508-735-00 | 5p Connector | |
| ●CN7 | 1-508-847-00 | 4p Connector | |
| ●CN8 | 1-508-742-00 | 3p Connector | |
| ●CN9 | 1-508-849-00 | 8p Connector | |
| D2–5 | 8-719-815-55 | 1S1555 | |
| D10 | 8-719-815-55 | 1S1555 | |
| ⇒D11–15 | 8-719-311-23 | SEL1122P-N | |
| D19 | 8-719-812-31 | TLR123 | |
| IC1 | 8-758-040-00 | CX804 | |
| IC2 | 8-759-040-46 | MC14046BCP | |
| IC3 | 8-757-610-00 | CX761 | |
| IC4 | 8-750-000-55 | CX7915 | |
| IC5 | 8-759-108-05 | μPC78L05A | |
| IC6 | 8-759-240-12 | TC4012BP | |
| IC7, 8 | 8-759-240-11 | TC4011BP | |
| IC9 | 8-759-965-60 | BA656 | |
| IC10 | 8-759-240-11 | TC4011BP | |
| IC11 | 8-759-240-12 | TC4012BP | |
| IC12 | 8-759-157-40 | μPC574J | |
| L1 | 1-407-184-xx | 3.3μH | |
| Q1 | 8-729-902-11 | 2SC2021 | |
| Q2 | 8-729-993-72 | 2SA937 | |
| Q4 | 8-729-902-11 | 2SC2021 | |
| Q5 | 8-729-139-04 | 2N3904 | |
| Q6 | 8-724-375-01 | 2SC403C | |
| Q7, 8 | 8-729-993-72 | 2SA937 | |
| R6 | 1-202-463-00 | 2.2M 1/4W | composition |
| ⚠R73, 74 | 1-213-155-00 | 10k 1W | metal oxide (nonflammable) |
| RV1 | 1-224-251-XX | 4.7k, adjustable | |
| S1–5 | 1-552-174-00 | Pushbutton | |
| S6, 7 | 1-516-226-00 | Slide | |

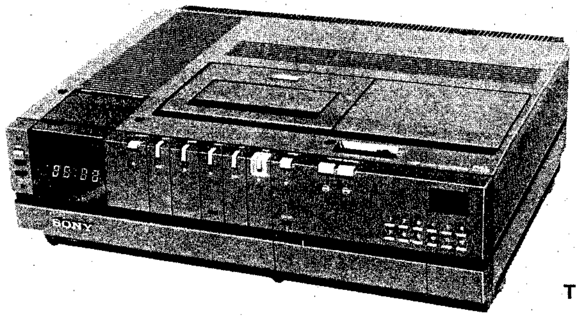
**The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.**

- Items marked "●" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- ⇒: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

Betamax

VIDEOCASSETTE RECORDER

# SL-C7E



## *AEP Model*
## *E Model*

**This Manual contains the Supplement No. 1 to No. 6.**

## SPECIFICATIONS

### General

**Video recording system:** Rotary two-head helical scanning

**Video signal:** CCIR standards, PAL colour

**Storage temperature:** −20°C to +65°C (−4°F to +149°F)

**Operating temperature:** 5°C to 40°C (41°F to 104°F)

**Aerial:** 75-ohm, asymmetrical aerial socket

**Channel coverage:** VHF Western European Channels E2–12
UHF Western European Channels E21–68
(a total of up to 12 preselected channels)

**RF output signal:** UHF channels E30 to E39 (variable)
75 ohms, unbalanced

**Power requirements:** 110–127V, 220–240V AC ± 10% (adjustable), 50/60 Hz

**Power consumption:** 45 W

**Dimensions:** 485 x 163 x 379 mm (w/h/d)
($19^{1}/8$ x $6^{1}/2$ x 15 inches)

**Weight:** 15.5 kg (34 lb 3 oz)

### Video

**Input:** VIDEO IN: BNC connector
1.0 V (p-p) $^{+1.0}_{-0.5}$ V (p-p), 75 ohms unbalanced, sync negative

**Output:** VIDEO OUT: BNC connector
1.0 V (p-p) ±0.1 V (p-p), 75 ohms unbalanced, sync negative

**Horizontal resolution:** Colour: 260 lines
B/W: 300 lines

**Signal-to-noise ratio:** Colour: Better than 40 dB
B/W: Better than 43 dB

### Audio

**Input:** AUDIO IN: Phono connector
47 kohms, −10 dBs.
MIC: mini jack
−60 dBs, suitable for microphone with 600-ohm impedance

**Output:** AUDIO OUT: Phono connector
Less than 10 kohms, −5 dBs
(47 k ohm load), unbalanced

**Frequency response:** 50 Hz to 10 kHz

**Signal-to-noise ratio:** Better than 40 dB

**Audio distortion:** Less than 4% at 400 Hz

MICROFILM

Consumer
VIDEO

### Tape transport

**Tape speed:** 18.73 mm/sec.

**Maximum recording time:** 2 hours 10 min (with Sony L-500 cassette)
3 hours 15 min (with L-750)

**Fast forward/rewind time:** Within $3\ ^{1}/2$ min. (L-500)

**Timer:** Only for recording
Electronic digital timer
24-hour-clock cycle
2 weeks 4 events

### Accessories supplied

Remote Commander RMT-200
Betamax Videocassette tape L-500
AC mains lead
75-ohm coaxial cable

### Remote commander

**Remote control system:** Infrared control

**Power requirements:** 6 V dc
Battery size AA x 4
(IEC battery designation R6)

**Dimensions:** 68 x 34 x 144 mm (w/h/d)
($2^{3}/4$ x $1^{3}/8$ x $5^{3}/4$ inches)

**Weight:** 220 g (8 oz)
including batteries

**Accessory supplied:** Battery size AA 4 pcs.

### SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY SHADING AND ⚠ MARK ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

SONY®

# SERVICE MANUAL

# TABLE OF CONTENTS

## 1. GENERAL

1-1. General . . . . . . . . . . . . . . . . . . . . . . . 1-1
1-2. Brief Circuit Description . . . . . . . . . . . . . 1-1
1-3. Connections . . . . . . . . . . . . . . . . . . . . . 1-5
1-3-1. Aerial Connection . . . . . . . . . . . . . . . . 1-5
1-3-2. Camera Recording . . . . . . . . . . . . . . . . 1-5
1-3-3. Audio Dubbing . . . . . . . . . . . . . . . . . . 1-6
1-4. Operation . . . . . . . . . . . . . . . . . . . . . . 1-7
1-4-1. Operation Voltage . . . . . . . . . . . . . . . . 1-7
1-4-2. Channel presetting . . . . . . . . . . . . . . . . 1-7
1-4-3. Variable Speed Playback . . . . . . . . . . . . . 1-9
1-4-4. Full Auto Rewind . . . . . . . . . . . . . . . . 1-11
1-4-5. APS (Automatic Programme Search) . . . . . . 1-11
1-4-6. Tape Counter And MEMORY Switch . . . . . . 1-11
1-4-7. Videocassette Safety Tab . . . . . . . . . . . . 1-11
1-4-8. Tracking Adjustment . . . . . . . . . . . . . . . 1-11
1-4-9. Timer Operation . . . . . . . . . . . . . . . . . 1-12
1-4-10. Remote Control Operation . . . . . . . . . . . 1-15
1-5. Disassembly . . . . . . . . . . . . . . . . . . . . 1-17
1-5-1. Cabinet Removal . . . . . . . . . . . . . . . . . 1-17
1-5-2. Tuner-I.F. Block Removal . . . . . . . . . . . . 1-18
1-5-3. Timer Block Removal . . . . . . . . . . . . . . 1-18
1-5-4. Timer Panel Removal . . . . . . . . . . . . . . 1-18
1-5-5. Checks of SA-3 and YC-6 Boards . . . . . . . . 1-18
1-5-6. Switching Regulator Removal . . . . . . . . . . 1-19
1-6. Location of Parts and Controls . . . . . . . . . 1-20

## 2. BLOCK DIAGRAMS

Overall . . . . . . . . . . . . . . . . . . . . . . . . . . 2-1
Video System . . . . . . . . . . . . . . . . . . . . . . 2-4
Servo System . . . . . . . . . . . . . . . . . . . . . . . 2-7
CUE/REVIEW . . . . . . . . . . . . . . . . . . . . . . 2-10
Capstan Servo Timing Chart (X3) . . . . . . . . . . . 2-10
Capstan Servo Timing Chart . . . . . . . . . . . . . . 2-11
Drum Servo Timing Chart . . . . . . . . . . . . . . . 2-12
Capstan Drive . . . . . . . . . . . . . . . . . . . . . . 2-13
Capstan Drive Timing Chart . . . . . . . . . . . . . . 2-15
System Control . . . . . . . . . . . . . . . . . . . . . 2-17
System Control Timing Chart . . . . . . . . . . . . . 2-19
Remote Control Timing Chart . . . . . . . . . . . . . 2-21
Audio Level Diagram . . . . . . . . . . . . . . . . . . 2-21
Audio . . . . . . . . . . . . . . . . . . . . . . . . . . . 2-22
Timer . . . . . . . . . . . . . . . . . . . . . . . . . . . 2-23
Timer Timing Chart . . . . . . . . . . . . . . . . . . . 2-25
Tuner-I.F. . . . . . . . . . . . . . . . . . . . . . . . . 2-27
Power Supply . . . . . . . . . . . . . . . . . . . . . . 2-29
Auto Programe Search . . . . . . . . . . . . . . . . . 2-30
Auto Program Search Timing Chart . . . . . . . . . . 2-31

## 3. PRINTED WIRING BOARD AND SCHEMATIC DIAGRAMS

Frame Schematic Diagram . . . . . . . . . . . . . . . . 3-1
NC-1/YC-6/CB-1/RF-2 and CR-4 Boards . . . . . . . . . 3-5
AS-3/LS-3/SJ-1 and FG-1 Boards . . . . . . . . . . . . 3-13
SY-11/SY-10/PL-2/RM-1/RM-2/IR-1/CN-5 and CN-6 Boards . . . . . . . . . . . . . . . . . . . . . . . . . . 3-21
CH-3/CI-1/PC-1/TU-11 and IF-10 Boards . . . . . . . . 3-29
FS-6/LF-11/TM-10/TM-11/TM-12 and SR-08 Boards . . 3-37

## 4. EXPLODED VIEWS

Cabinet Assembly . . . . . . . . . . . . . . . . . . . . 4-1
Cassette Lift Assembly . . . . . . . . . . . . . . . . . 4-3
Function Assembly . . . . . . . . . . . . . . . . . . . 4-4
Tuner Chassis . . . . . . . . . . . . . . . . . . . . . . 4-5
Power Unit Chassis . . . . . . . . . . . . . . . . . . . 4-6
Drum Assembly . . . . . . . . . . . . . . . . . . . . . 4-7
Chassis Assembly (1) . . . . . . . . . . . . . . . . . . 4-8
Chassis Assembly (2) . . . . . . . . . . . . . . . . . . 4-9
Chassis Assembly (3) . . . . . . . . . . . . . . . . . . 4-10
Chassis Assembly (4) . . . . . . . . . . . . . . . . . . 4-11
Chassis Assembly (5) . . . . . . . . . . . . . . . . . . 4-12
Chassis Assembly (6) . . . . . . . . . . . . . . . . . . 4-13
Lower Frame Assembly . . . . . . . . . . . . . . . . . 4-14
Packing . . . . . . . . . . . . . . . . . . . . . . . . . . 4-15
Commander Block Assembly . . . . . . . . . . . . . . 4-16

## 5. ELECTRICAL PARTS LIST

## 6. SUPPLEMENT No. 1: ADDITION OF A MODEL FOR ASIA, AFRICA AND AUSTRALIA.

## 7. SUPPLEMENT No. 2: ALIGNMENT

## 8. SUPPLEMENT No. 3: TUNER BLOCK MODIFICATION

## 9. SUPPLEMENT No. 4: SWITCHING MODE REGULATOR ALIGNMENT

## 10. SUPPLEMENT No. 5: CH-7 BOARD CHANGE

## 11. SUPPLEMENT No. 6: ADDITION OF SILVER METALLIC CALOR CASE

# SECTION 1
# GENERAL

## 1-1. GENERAL

Video cassette recorder SL-C7E is the highest grade model with a logic control function for coping with the high speed picture search and the variable speed playback functions. The machine has many functions such as the 4 event/4 day timer, the remote commander, the automatic tuning system, and others. The features of the machine are as follows.

**Main feature include:**

**Logic control system**
The function buttons are feather light to touch. The operating mode may be changed without pressing the STOP button between modes. A tuned channel is not changed during record mode by misoperation.

**Picture search operation**
To locate a particular portion rapidly, the tape may be advanced or rewound at high speed while displaying the picture on the TV screen.

**Variable playback speed**
During playback, tape speed can be changed to any of these modes: still, frame-by-frame advance, slow-motion and triple-speed.

**Timer recording**
Recording may be started at any time on any of the next fourteen days and stopped after a predetermined interval. In addition, programming of up to 4 timer setting is possible.

**Remote control**
With the Sony Remote Commander RMT-200 (supplied), you can command the tape transport (still, frame-by-frame advance, slow-motion and triple-speed) and select previously preset channels up to 10 meters away from the recorder.

**Auto programme search function**
The APS switch facilitates locating the beginning of recorded programmes.

**Camera recording**
Camera recording can be made. The camera, equipped with the Sony K-type (14-pin) camera cable, can be connected directly to this recorder.
The power supply to the camera, and the video and audio inputs from the camera to the recorder are made through only one connecting cable.

**Full auto rewind**
At the end of the tape, the tape transport stops and the tape fully rewinds automatically.

**Audio dubbing**
Audio (commentary, music, etc.) may be added to a previously made video recording.

**Automatic programming**
Channel preset can be automatically set.

**Timing phase pause**
Elimination of picture disorder at the joint of the joint picture recording by the timing phase circuit.

## 1-2. BRIEF CIRCUIT DESCRIPTION

The major circuit boards of the SL-C7E and their functions are listed below.

| | |
|---|---|
| YC-6 board | : Y & chroma signals record/playback processing circuit |
| NC-1 board | : Noise cancellar circuit of Y signal |
| CR-4 board | : Chroma process circuit during variable playback mode |
| RF-2 board | : Down-converted chroma signal and Y-FM signal record/playback processing circuit |
| SY-10, -11 boards | : Function key and logic control circuit |
| PL-2 board | : Solenoid drive circuit |
| IR-1 board | : Remote control receiver circuit |
| AS-3 board | : Audio signal record/playback circuit & servo circuit |
| SJ-1 board | : Servo control circuit during variable playback mode |
| TM-10<br>TM-12 } board | : Programme timer circuit |
| TU-11 board | : Tuner & DC convertor circuit |
| IF-10 board | : VIF, SIF and AFT circuit |
| CH-3 board | : Auto tuning system circuit |

Highly integrated circuits and modules are used in the machine. A microcomputer is employed in each of the system control receiver section and the timer section for centralizing and ensuring the complicated internal controls.

A switching mode regulator is employed in the power supply section for dealing with the fluctuation of the power supply voltage, increasing the conversion effect, and reducing the power consumption.

The ICs used and their functions in the various circuits are listed in the table below.

**SY-11 board**

| | |
|---|---|
| μPD546C107 | System control |
| μPD547C049 | System control |
| BX342 | Tape end detector |

**SY-10 board**

| | |
|---|---|
| μPD547C060 | Remote control receiver decorder |

**AS-3 board**

| | |
|---|---|
| CX143A | Capstan servo |
| CX186 | Drum servo |
| TA7120P | CTL signal & FG signal amplifier |

**YC-6 board**

| | |
|---|---|
| CX187 | Y signal process |
| CX136A | Color signal process |
| CX150 | Phase detect |
| CX145 | Color sync |
| CX832 | APC & AFC |
| M58478P | Servo reference counter |
| CX130 | Video switch |

**RF-2 board**

| | |
|---|---|
| CX134A | RF playback amplifier, RF switcher & drop out compensator |

**NC-1 board**

| | |
|---|---|
| CX135 | Video signal demodulator & limiter |

**CH-3 board**

| | |
|---|---|
| CX760 | Digital tuning |
| CX761 | Memory |
| μPC78L05A | 5 V regulator |
| CX804 | Channel decorder |
| MC14046BCP | PLL |
| BA656 | Tuning voltage indicator |

**CT-1 board**

| | |
|---|---|
| SN29764N | Channel indicator |

**TM-10 board**

| | |
|---|---|
| MB8841-180 | Timer control |
| μPA56C | Transistor array |
| M58478P | Reference counter |

**TM-11 board**

| | |
|---|---|
| μPC78L05A | 5 V regulator |

**SR-08-2 board**

| | |
|---|---|
| TL494CN | Switching mode regulator |

**RM-1 board**

| | |
|---|---|
| M50112P | Remote control encoder |

**IF-10 board**

| | |
|---|---|
| TBA1440G | VIF, DET & AGC |
| TBA120U | SIF |
| M5135P | AFT |

**CR-4 board**

| | |
|---|---|
| TA7320BP | Chroma phase detect during variable playback mode |
| TC4528BP | MMV |
| TC4027BP | Flip-flop |
| CX150 | Chroma phase arrange switch & burst gate |
| CX130 | Chroma switch |

## [VIDEO CIRCUIT]

The video signal system circuitry is arranged with the circuits on the YC-6 board, RF-2 board, NC-1 board, and CR-4 board.

The circuit on the RF-2 board includes the record amplifier to supply the down-converted chroma signal and the luminance FM signal to the video head, the pre-amplifier to amplify the playback signal from the video head, the circuit to separate the playback signal into the playback Y signal and the chroma signal. The Y signal is fed to the limiter and the dropout compensation circuit and supplied to the YC-6 board. The chroma signal is fed to the low pass filter and supplied to the YC-6 board. (CX134A)

The YC-6 board, major board of the video system, has the input and output connectors and the input selector switch and includes the luminance signal circuit (CX187), the chroma system circuit (CX136A, CX832, CX150 & CX145), and the servo reference circuit (M58478P).

The input video signal is separated to the luminance signal and the chroma signal in the REC mode. The luminance signal is fed to AGC, the chroma signal is fed to ACC, and the two signals are mixed, becoming the E-E output. The luminance signal after the Y/C separation is emphasized in the non-linear emphasis circuit and fed to the FM modulator in the CX187.

The luminance FM signal is shifted by 1/2 fH for the crosstalk offset in order to remove the crosstalk in the comb filter circuit for the Y signal in playback. The chroma signal passed the ACC circuit after the Y/C separation is down-converted by the AFC idler signal (in the CX136A).

A false burst is inserted into the down-converted chroma signal for improving the S/N ratio of the APC in the record and the playback. The phase of the false burst locks to the one of the burst signal in the input signal and the point where the false burst is inserted is in the horizontal sync signal. The down-converted chroma signal and the FM-modulated luminance signal are fed to the RF-2 board where the signals are mixed and supplied to the video head.

In the PLAY mode, the signal from the video head is separated into the luminance signal and the chroma signal on the RF-2 board. The luminance signal is processed in the limiter and fed to the YC-6 board. The signal demodulated in the CX187 is fed to the 1 H delay line for the dropout compensation on the YC-6 board and supplied to the NC-1 board.

The signal from the YC-6 board is mixed with the demodulated signal in the CX135 on the NC-1 board and fed to the comb filter of the Y signal where the crosstalk in the Y signal is removed because of the 1/2 fH shift in the record mode. The signal passed the Y comb filter is corrected in the non-linear de-emphasis circuit and goes to the AGC circuit in the CX187. The chroma signal supplied to the YC-6 board from the RF-2 board is fed to the ACC circuit in the CX136A via the low pass filter. This down-converted PB chroma signal is converted to 4.43 MHz by the idler signal processed in the AFC and the APC circuits and mixed with the luminance signal passed the AGC circuit in the CX187 after the false burst inserted into the chroma signal is removed, becoming the output video signal.

The chroma signal in the VARIABLE PLAYBACK mode (TRIPLE SPEED, PAUSE, & PICTURE SEARCH) is processed on the CR-4 board. Sometimes the head goes across the recorded track and traces a different track in the VARIABLE PLAYBACK mode, making the color continuity, the character of the PAL system, discontinuous. The discontinuity is corrected on the CR-4 board. A noise is caused when the head goes across the track in the VARIABLE PLAYBACK mode and the vertical sync does not function on the TV receiver when the noise is superimposed on the vertical sync. Therefore a newly produced vertical sync is added. Since the S/N ratio of the color burst in the noise section is poor, a newly produced burst is also added.

## System Control

The system control circuitry is on the SY-10, the SY-11 and the PL-2 boards.

The circuits on the SY-10 board is arranged with the input interface circuit of the function switch, the remote control decoder circuit and the end alarm circuit. The signal is converted to a key matrix signal when the function button is pressed, fed to the microcomputer on the SY-11 board, and converted to a continuous system control signal. A sample of the system control signal produced on the SY-11 board goes to the PL-2 board where it controls the solenoid. The other portion of the signal becomes the mode control signal supplied to the AS-3 board. The IR-1 board of the remote control receives the modulated infrared electromagnetic wave and the amplified signal goes to microcomputer μPD547C060 on the SY-10 board where it is decoded. The decoded signal goes to the SY-11 board and is converted to the system control signal in microcomputers μPD546C107 and μPD547C049.

## Servo Circuit

1. **Drum servo circuit**
   The drum servo circuit is located on the AS-3 board and the motor drive circuit on the LS-3 board. The drum is driven directly by the drum motor.
   The rotation number of the drum is maintained to constant in the REC mode by the PG signal (25 Hz) obtained from the PG coil and the rotational phase is controlled to constant by comparing the phase of the PG signal with the one of the vertical sync signal (VD) separated from the video input signal.

2. **Capstan servo circuit**
   The capstan servo circuit and the CTL record/playback amplifier, are on the AS-3 board and the motor drive circuit is on the LS-3 board.

   The object of this circuit is;
   1. To keep the tape speed stable.
   2. To work as the tracking servo in the PLAY mode.
      The speed servo is applied to the DC motor driving the capstan by the FG. At the same time the phase of the signal from the FG attached on the capstan flywheel is compared with the one of the vertical sync signal separated from the video input signal and the phase servo is applied to the motor for keeping the constant rotation speed of the capstan.
      In the PLAY mode, the phase of the CTL signal reproduced from the tape is compared with the one of the 50 Hz reference signal obtained by counting down the 4.43 MHz (X'tal) on the YC-6 board for the tracking servo. The tracking servo makes the video heads trace the magnetic patterns on the tape correctly.

## Various Playbacks

1. **Triple-speed playback circuit (x 3)**
   The triple-speed playback circuit is on the AS-3 board. This circuit applies the speed servo to the capstan motor so that the motor rotates at a triple speed (about 3000rpm) of the one in the normal playback and compares the phase of the signal obtained by counting down the CTL signal (75 Hz in this case) to 1/3 with the one of the internal reference signal described previously for the phase servo. The phase servo makes the noise bands position at the top and bottom of the picture.

2. **Slow-motion, still, and frame-by-frame circuits**
   These circuits are on the AS-3 and the SJ-1 boards. Since the tape speed is slow in these modes, the capstan motor is driven by the pulse drive method (to apply and cut off the voltage to the motor periodically) for stabilizing the tape speed.

   - The time for applying voltage is varied by the slow VR for changing the tape speed in the SLOW-MOTION mode.

   - The phase of the RF-SW pulse is compared with the one of the pulse which is obtained from the CR-4 board and indicates the positions of the noise bands in the STILL mode. When the pulses are out of phase, the tape is fed by the pulse drive method. When the pulses are in phase, the pulse drive is stopped so that the noise bands stay at the top and bottom of the picture.
     The pulse to indicate the positions of the noise bands is generated on the CR-4 board whenever the color discontinuity is detected from the playback color singal by the video head when the video head goes across the recorded video track on the tape pattern. Consequently the position of the noise occupies at an optional point on the picture when the playback picture not having the color signal is made to be stationary.

   - In the FRAME-BY-FRAME mode, the pulse drive is made forcibly for a certain time by pressing the automatic FRAME button so that the phases of the RF SW pulse and the pulse indicating the position of the noise band are varied, the same operation as the STILL is done until the phases lock, and the noise bands are stopped at the top and bottom of the picture.

3. **Picture search circuit**
   The control of the rotation number of the drum in the PICTURE SEARCH mode is done on the AS-3 board. The number of the CTL pulses in the PICTURE SEARCH mode is larger than the one in the normal PB mode. The error voltage obtained by integrating the CTL pulse is added to the drum servo voltage so that the horizontal sync signal is controlled to be approx. 15.625 Hz even in the PICTURE SEARCH mode.

4. **Color signal process circuit in variable speed mode**
   The color signal process circuit in the VARIABLE SPEED mode is on the CR-4 board. Sometimes the color condituity which is the characteristic of the PAL signal is lost when the video head goes across the video track recorded on the tape and plays back another video track. The discontinuity of the color signal is detected and immediately the correction is made for maintaining the color continuity.
   The S/N ratio of the playback signal is poor around the noise bar and the burst signal which is the reference of the color signal is not in the playback signal.
   If such a variable speed playback color signal is fed to the TV receiver, the color discrimination circuit malfunctions and no color appears on the picture. The playback burst signal is replaced by a new burst signal locked to the playback burst signal in order to produce the variable speed playback color signal on the CR-4 board. Thus the color picture can be viewed in the VARIABLE SPEED mode.

## Audio Circuit

The audio circuit is on the AS-3 board. The erase oscillator and the bias circuits are also on the AS-3 board.

## Tuner Block

The tuner block comprises the automatic tuning preset section, the channel select section, the IF section, the tuner AGC, the tuner section, the antenna booster, the mixer section, the RF modulator section, and the antenna terminal board.

1. **Tuner**
   The VHF tuner and the UHF tuner are mounted on the TU-11 board.

2. **Automatic tuning preset section**
   The control section of the automatic tuning, its memory and the decoder for introducing the channel signal fed from the channel select section are on the CH-3 board. The preset section is designed so that the channel set in the TIMER RECORD mode can be done by the channel data fed from the timer section.

3. **Channel select section**
   The channel select switch and the channel desplay section are on the CI-1 board. The channel desplay section comprises the display LEDs and the decoder IC to drive the LEDs.

4. **IF section**
   The IF section consisting of VIF, SIF and AFT is on the IF-10 board.

5. **Tuner AGC section**
   The tuner AGC control circuit is arranged on the IF-10 board. The VIF ciruit detects the level of the IF signal and converts it to a voltage, controlling the tuner gain.

6. **Antenna booster and mixer section**
   The BT-971 is constructed with the antenna booster and the mixer.
   The mixer section mixes the telecast signal entered the AERIAL IN terminal with the signal from the RF modulator out of the VTR and feeds the mixed signal to the receiver from the AERIAL OUT terminal. The booster section distributes the signal came in the AERIAL IN terminal to the signal fed to the tuner in the VTR and to the signal fed to the receiver directly through the mixer and involves the amplifier to correct the signal loss due to the signal distribution and the signal loss due to the mixer.

## Timer Circuit

The timer ciruit is arranged by the circuits on the TM-10, -11 and -12 boards. 4 programs for 14 days can be placed into the memory of this timer and the memory once placed is maintained by the incorporated battery for the compensation of the power interruption unless the power interruption more than 10 minutes occurs. The timer as a normal clock employs the crystal lock system to use the 60 Hz signal obtained by counting down the signal oscillated in a crystal oscillator and the clock can work without regarding the frequency fluctuation of the input power supply.

## Power Supply Block

The power supply block is constructed by power unit SR-08. The SR-08 comprises two blocks, one is the main power supply block employing the switching mode regulator system and the other is the ever power supply employing the series regulator system.

The main power supply supplies the power to all the sections except the timer and the booster and can follow the input voltage variation from 110V up to 240V.

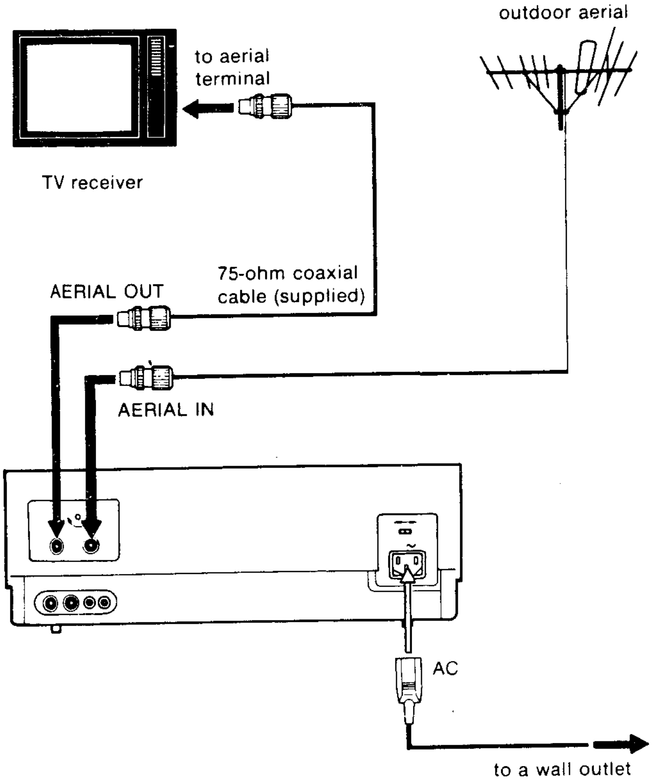
The ever power supply always works unless the main power switch is turned off and supplies the power to the timer and the antenna booster. The external voltage selector for 110–127V and 220V–240V switches only the ever power supply.

## 1-3. CONNECTIONS

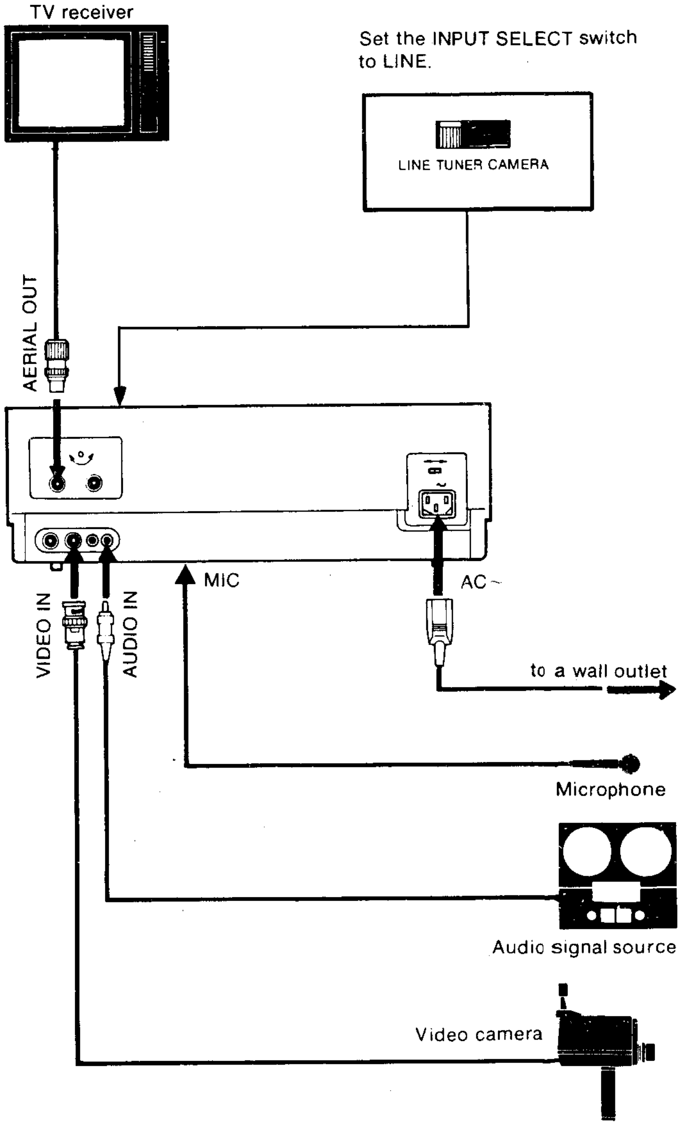
### 1-3-1. Aerial Connection

This recorder is equipped with a standard aerial connecting socket. Use a coaxial aerial connecting cable equipped with a single plug and insert the plug into the AERIAL IN connector on the recorder. Make the connection between AERIAL OUT connector on this recorder and the aerial socket on the TV receiver with the 75-ohm coaxial cable supplied.

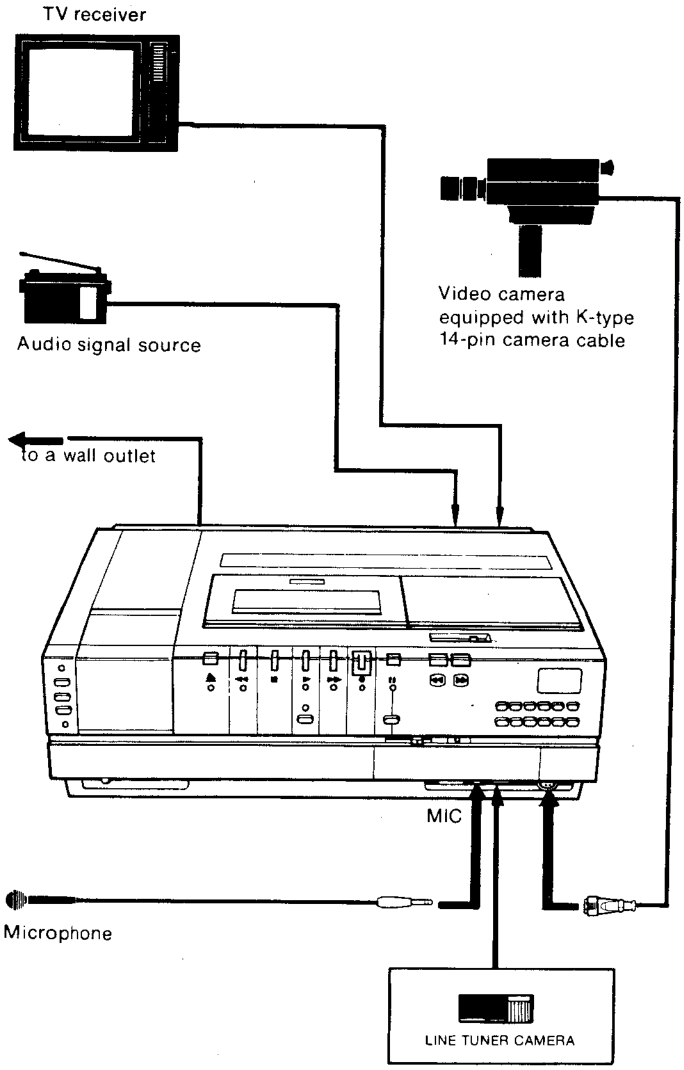
- Either a telecast TV signal or an output signal from the built-in RF unit is obtained from the AERIAL OUT connector.


outdoor aerial
to aerial terminal
TV receiver
AERIAL OUT
75-ohm coaxial cable (supplied)
AERIAL IN
AC
to a wall outlet

### 1-3-2. Camera Recording


TV receiver
LINE TUNER CAMERA
AERIAL OUT
VIDEO IN
AUDIO IN
MIC
AC ~
to a wall outlet
Microphone
Audio signal source
Video camera

Set the INPUT SELECT switch to LINE.


TV receiver
Video camera equipped with K-type 14-pin camera cable
Audio signal source
to a wall outlet
MIC
Microphone
LINE TUNER CAMERA

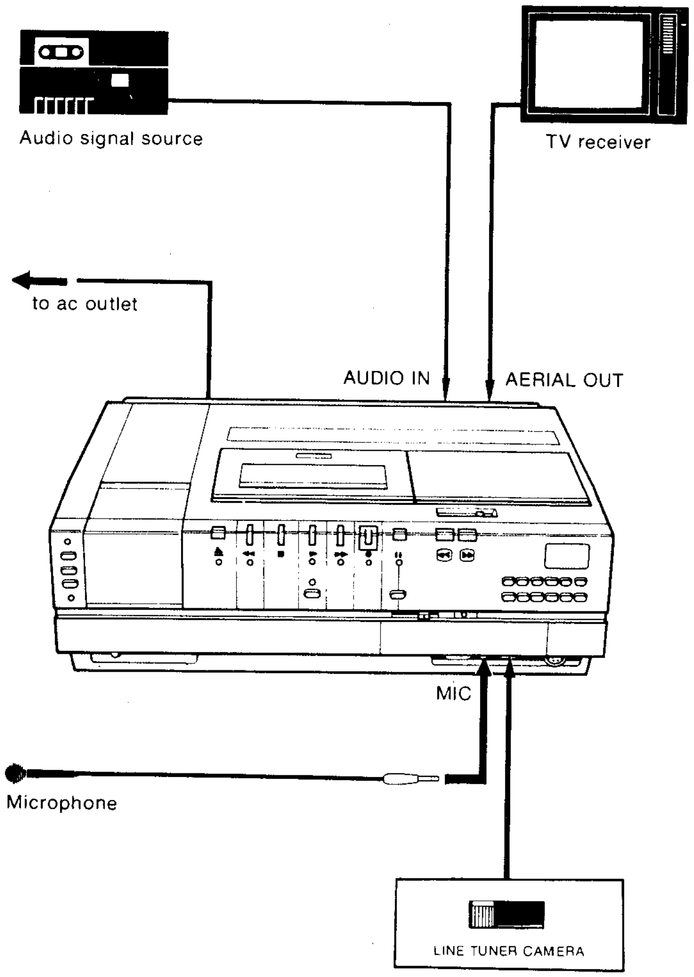
Set the INPUT SELECT switch to CAMERA.

**Notes**

- Cameras must conform to CCIR TV standards.
- When a camera is equipped with Sony K-type (14-pin) camera cable (for example HVM-100CE), connect the camera to the CAMERA connector. In this case, set the INPUT SELECT switch to CAMERA.

  When a camera is connected to the VIDEO IN connector using a BNC-type connector, set the INPUT SELECT switch to LINE.
- In camera recording, connect a microphone to the MIC connector, or connect a tape recorder or a record player to the AUDIO IN connector.
- The MIC connector has priority over the AUDIO IN connector. Any input to the AUDIO IN connector is automatically disconnected whenever a microphone is plugged into the MIC connector.

### 1-3-3. Audio Dubbing


Audio signal source
TV receiver
to ac outlet
AUDIO IN
AERIAL OUT
MIC
Microphone
LINE TUNER CAMERA

Set the INPUT SELECT switch to LINE.

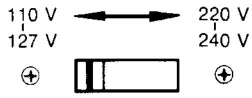
- TV volume should be turned down to prevent acoustic feedback (whistle-like sounds).

## 1-4. OPERATION

### 1-4-1. Operating Voltage

This machine operates on 110V – 127V or 220V – 240V. Before connecting the unit to the power source, check that the voltage selector setting is correct for your power supply. (The voltage selector is located on the rear panel.)

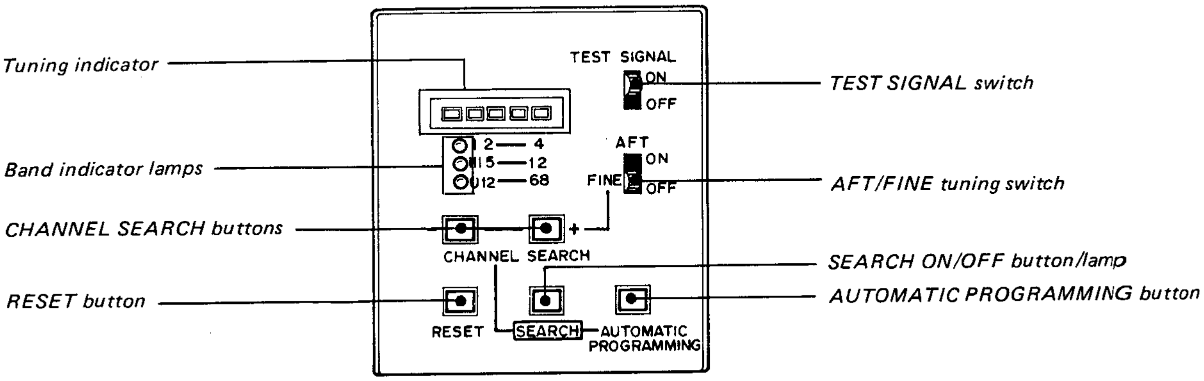
Reset the selector if your local mains supply is not same as that of the recorder.


110 V
127 V
220 V
240 V

### 1-4-2. Channel presetting

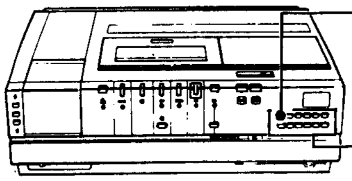
You can preset automatically all the channels in numerical sequence at one time or, if you wish, preset the channels one by one.

**Location of control**


Tuning indicator
Band indicator lamps
CHANNEL SEARCH buttons
RESET button
TEST SIGNAL switch
AFT/FINE tuning switch
SEARCH ON/OFF button/lamp
AUTOMATIC PROGRAMMING button
TEST SIGNAL
ON
OFF
AFT
ON
FINE
OFF
I 2—4
III 5—12
U 12—68
+
CHANNEL SEARCH
RESET
SEARCH
AUTOMATIC PROGRAMMING

1. **To preset all the receivable VHF and UHF channels**

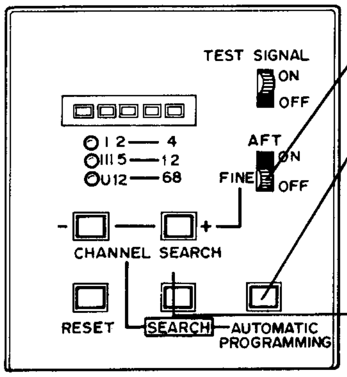
With the automatic programme search system, receivable channels in your area can be preset to the channel select buttons in numerical sequence; from the channel with the lowest frequency to the channel with the highest.



① Press channel select button "1". "1" will appear in the channel indicator.
- If the number "1" does not appear, check that the INPUT SELECT switch at the front panel is set to TUNER.

⑤ Check the picture quality of the preset channels by pressing the channel select buttons on the recorder.
If there are channels which do not provide satisfactory reception and you wish to erase the memories of these channels and rearrange the sequence of channels, proceed as indicated in "Ⓑ To preset the channels one by one".

Open the lid to expose the presetting controls.


TEST SIGNAL
ON
OFF
AFT
ON
FINE
OFF
I 2—4
III 5—12
U12—68
-
+
CHANNEL SEARCH
RESET
SEARCH
AUTOMATIC PROGRAMMING

⑥ Set the AFT switch to ON.

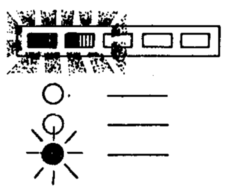
③ Press the AUTOMATIC PROGRAMMING button. Automatic programming will begin. The channel with the lowest frequency will be memorized on the channel select button "1". This tuning and memorizing procedure will be repeated in sequence until no more channels can be found.

② Press the SEARCH ON/OFF button. The corresponding lamp will light. The channel number display in the channel indicator will blink indicating that the recorder is in search mode.

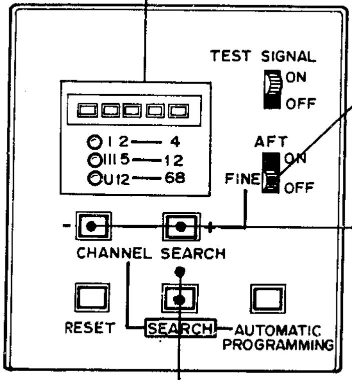
④ When the automatic channel presetting is completed, press the SEARCH ON/OFF switch to release the channel search mode (OFF). The lamp will go off.

2. **To preset the channels one by one**
To arrange the channels one by one in the sequence you want, proceed as follows:

**Ex. UHF channel 41**



**Tuning Indicator and Band Indicator Lamps**
The red lamp when lit shows you are in the band including VHF channels 2 through 4, the yellow lamp when lit shows you are in the band including VHF channels 5 through 12, and the green lamp when lit shows you are in the band including UHF channels 21 through 68.
Within each of these bands, the multi-segment Tuning Indicator will show in what portion of the band you are tuned to at any given moment, with the left-most segment indicating the lowest frequency within each band, and the right-most segment indicating the highest frequency within each band.



① Press the channel select button to be preset.
The number corresponding to the selected button will light in the channel indicator.

⑦ Set the AFT switch to ON.

③ Press CHANNEL SEARCH [–] button for locating a lower frequency channel, or the CHANNEL SEARCH [+] button for locating a higher frequency channel (Do not hold the button in, just press it for a moment). The automatic channel search will begin and will stop when the first station is received.
- Allow one or two minutes for the picture to stabilize.

④ Referring to the picture displayed on the TV screen, repeat step ③ until the desired station is received.
Use the tuning indicator and band indicators as guides.
- If the automatic search will not activate when the CHANNEL SEARCH [–] or [+] button is pressed, press the opposite [+] or [–] button.

⑤ Repeat steps ①, ③ and ④ until every TV station you want has been preset on the recorder.

② Press the SEARCH ON/OFF button (ON). The lamp will light to indicate that the recorder is in the search mode. The channel number display in the channel indicator will blink.

⑥ Press the SEARCH ON/OFF button again. The lamp will go off.
- The channel display on the channel indicator will stop blinking.

**RESET button**

This button is used to erase the memory on a depressed channel select button.

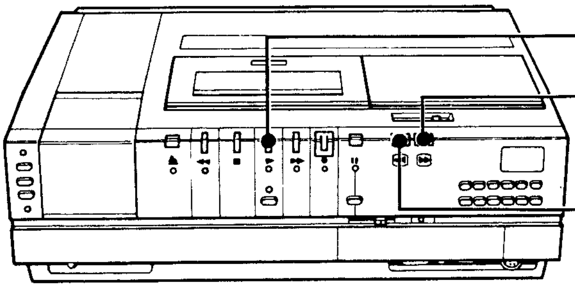
During remote control operation, the buttons whose memories are erased will be skipped (see page 1-15).

To erase the memory:
① Press the channel select button to be skipped.
② Press the SEARCH ON/OFF button (ON).
③ Press the RESET button.
④ Repeat steps ① and ③ until on all remaining channels the memories are erased.
⑤ Press the SEARCH ON/OFF button again (OFF).

### 1-4-3. Variable Speed Playback

During playback, it is possible to view a still, slow-motion, triple-speed or high-speed picture.

**PICTURE SEARCH (high-speed picture)**



① Press the PLAY button.

② Press the ▶▶ button.
While pressing this button, the high-speed playback picture in the forward direction can be seen.

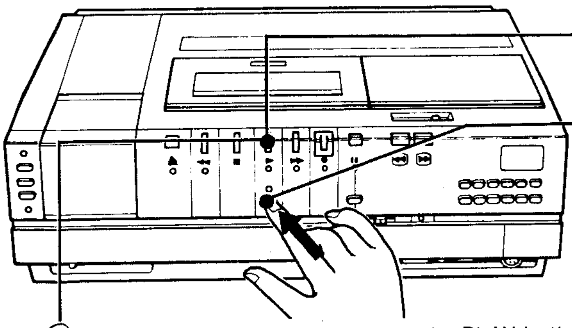
② Press ◀◀ button. While pressing this button, the high-speed playback picture in the reverse direction can be seen.

③ When the ▶▶ or the ◀◀ button is released, the tape returns to its normal playback speed.

**Notes**

- Streaks appear on the playback picture, but this is normal and not a problem.
- If the picture flows vertically, adjust the vertical hold control on the TV.
- During picture search, the sound is disconnected.
- The recorder may stop if the high-speed search function is used repeatedly over a period of short time.

**TRIPLE SPEED PLAYBACK**



① Press the PLAY button.

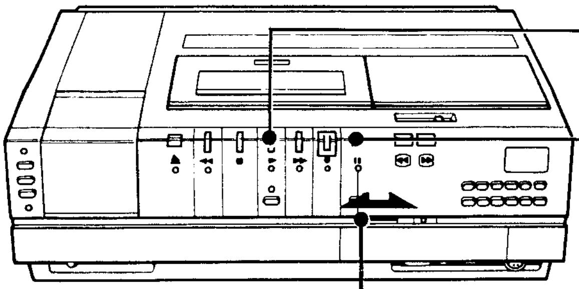
② Press the X3 button. The playback picture can be seen at three times the normal speed.

③ To return to normal speed, press the PLAY button again.

**Notes**

- If streks appear on the triple-speed playback picture, adjust the TRACKAING control. When triple-speed playback is finished, return the control to the centre detent position.
- During triple-speed playback, the sound is disconnected.

## STILL PICTURE AND SLOW-MOTION PICTURE



① Press the PLAY button.

② Press II button.
Picture motion will stop.
● Make sure that the STILL/SLOW lever is set to its far left (STILL) position.

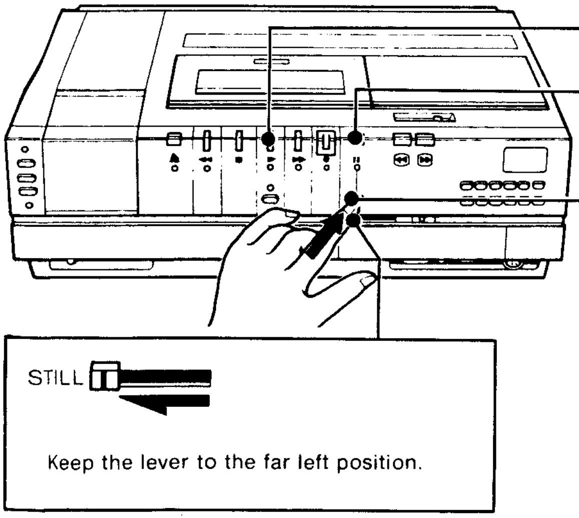
③ For a slow-motion picture, slide the lever to the right.
The far right position gives half normal speed.

Streaks and double images will appear during this operation, but this is normal and not a problem.

**Notes**

- After more than 8 minutes in the pause mode of operation, the pause mode will be automatically released and the previous playback mode will be resume.
- During slow-motion picture operation, the sound is disconnected.

## FRAME-BY-FRAME PICTURE



Keep the lever to the far left position.

① Press the PLAY button,

② Press II button. Picture motion will stop.

Press the FRAME button. A frame-by-frame advance of the tape is possible by pressing this button.
Pressing this button for a moment will advance the picture one frame.
Keeping this button pressed will continuously advance picture a frame every 2 seconds.

### 1-4-4. Full Auto Rewind

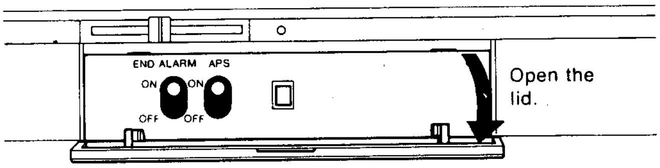
When the tape reaches its end, it will stop automatically and the REC, PLAY or FF lamp will go out. The END ALARM will sound for 10 seconds if the END ALARM switch is set to ON. Then, the REW lamp will light and the tape will automatically rewind to the beginning and stop.

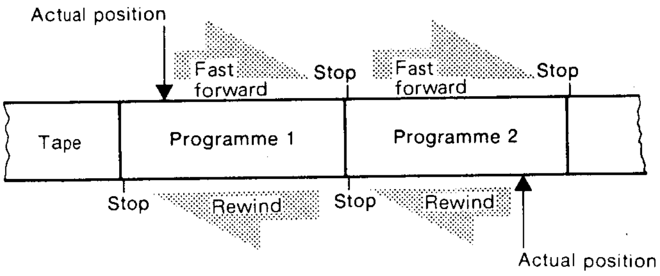
### 1-4-5. APS (Automatic Programme Search)

Use the APS switch to locate a beginning of the programmes on a recorded tape.

Each time the REC button is pressed, a cue signal is recorded on the tape. During the fast forward or rewind modes, if this switch is set to ON, the recorder will detect the nearest cue signal and will stop. Thus the starting point of a recorded programme may be easily found.

If another programme on the tape must be relocated beyond the position where the tape has stopped, press the FF or REW button again.


END ALARM APS
ON
ON
OFF
OFF
Open the lid.


Actual position
Fast forward
Stop
Fast forward
Stop
Tape
Programme 1
Programme 2
Stop
Rewind
Stop
Rewind
Actual position

**Notes**

- This mechanism functions when a tape recorded on a machine with an APS function is used.
- In order for the APS function to operate, the tape must travel a certain distance.
- When this function is not required, set this switch to OFF.

### 1-4-6. Tape Counter And MEMORY Switch

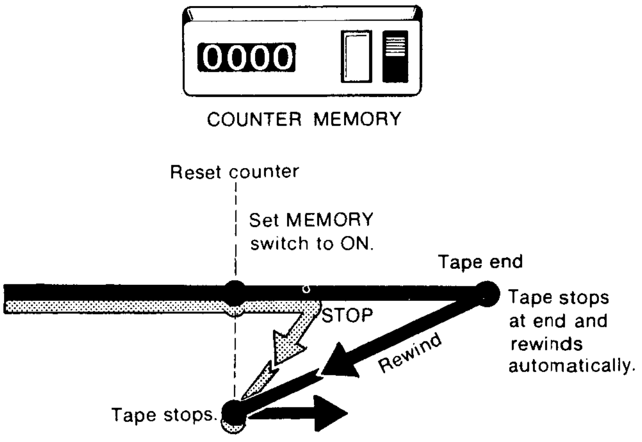
For later reference in playback, reset the Tape COUNTER to "0000" before starting a recording.

The MEMORY switch is used for precise programme relocation of a recorded tape.

1. Locate any desired starting point on the tape and reset the Tape COUNTER to "0000" at this point.
2. Set the MEMORY switch to ON.
3. Play or record a tape.
4. Press the STOP button.
5. Press the REW button.

The tape will rewind and stop automatically at a point near the tape COUNTER reading "9999" (one count before "0000" in order to avoid missing the starting point).

- To rewind the tape further than "0000", press the REW button again.

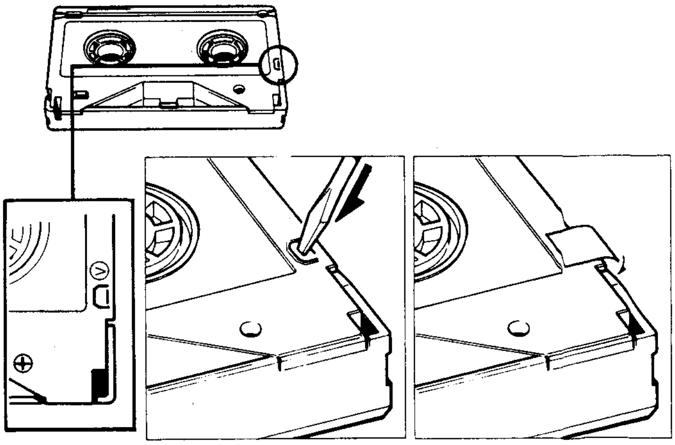

0000
COUNTER MEMORY
Reset counter
Set MEMORY switch to ON.
Tape end
STOP
Tape stops at end and rewinds automatically.
Rewind
Tape stops.

**Notes**

- When this function is not required, set this switch to OFF.
- If the machine stops before reaching the counter reading "0000", check that the APS switch is set to OFF.

### 1-4-7. Videocassette Safety Tab

To protect a recording from accidental erasure, break off the tab on the bottom of the videocassette using a screwdriver or similar. With the tab removed, the record mode does not function. If you wish to record on a cassette with the tab removed, simply cover the hole with a piece of cellophane or vinyl tape.

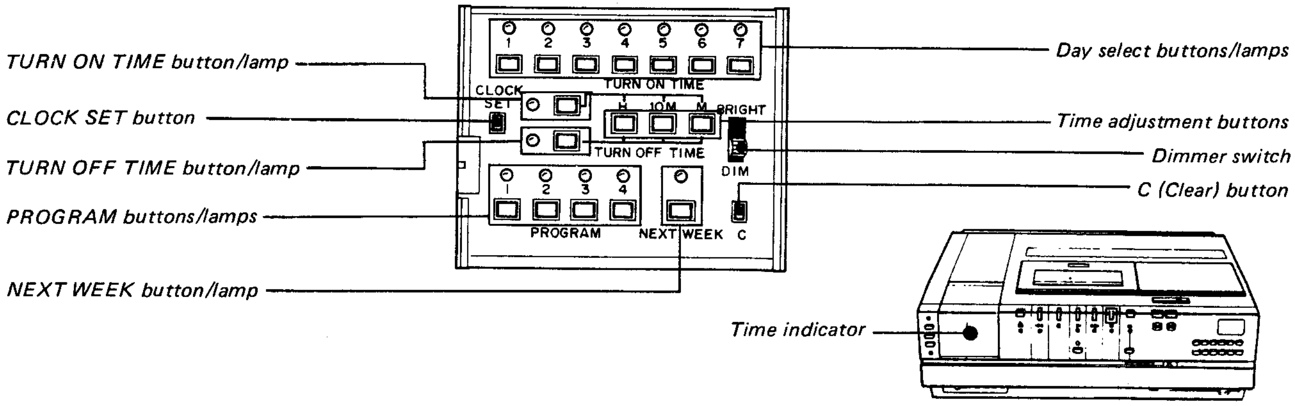


### 1-4-8. Tracking Adjustment

In the unlikely event that streaks or snow appear in the playback of tapes made on other recorders or in the triple speed playback picture, turn the TRACKING control in either direction until the best picture is obtained. Allow a second or two for the new settings to take effect. When playback of this particular tape is finished, return the TRACKING control to its centre detent position.

### 1-4-9. Timer Operation

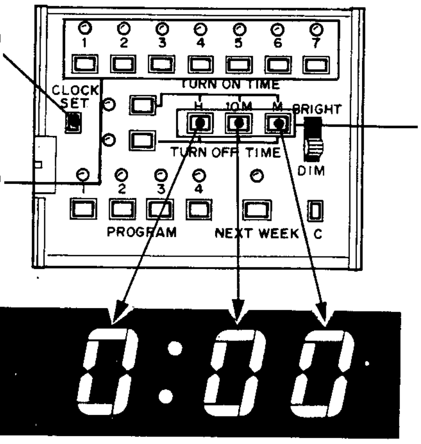
#### 1. LOCATION OF CONTROLS


TURN ON TIME button/lamp
CLOCK SET button
TURN OFF TIME button/lamp
PROGRAM buttons/lamps
NEXT WEEK button/lamp
Day select buttons/lamps
Time adjustment buttons
Dimmer switch
C (Clear) button
Time indicator
1 2 3 4 5 6 7
CLOCK SET
TURN ON TIME
H 10M M
BRIGHT
TURN OFF TIME
DIM
1 2 3 4
PROGRAM
NEXT WEEK
C

#### 2. CLOCK TIME ADJUSTMENT

①
Hold the CLOCK SET button depressed with the tip of a pen or similar through step ③.

② Press the appropriate day select button. The corresponding lamp will light. For details, refer to "DAY ADJUSTMENT".


1 2 3 4 5 6 7
CLOCK SET
TURN ON TIME
H 10M M
BRIGHT
TURN OFF TIME
DIM
1 2 3 4
PROGRAM
NEXT WEEK
C
0:00

③ Press the H button for hour digits. At first keep the button depressed to advance the digits rapidly and then press and release immediately to advance the digits one by one as the desired hour indication is approached. Press the 10 MIN and MIN buttons in the same manner.

④ Release the CLOCK SET button at a time signal from a broadcast or telephone. The clock is now set to maintain the correct time.

**Notes**

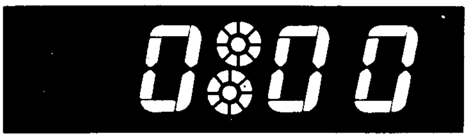
- Whenever the CLOCK SET button is depressed, the clock is set back to 0 second of the current minute and the clock begins to operate again only after the button is released. Therefore, do not press the button unnecessarily as the clock will lose time.
- When the CLOCK SET button is released, the upper dot blinks, and after 30 seconds, the upper dot stops blinking and the lower dot blinks.

**Dimmer switch**

This switch selects the brightness of the timer indicator. It may be set to BRIGHT during daylight hours and to DIM at night.

**If the dots blink**

If the dots between the hour and minutes blink quickly, the time and the timer setting must be reset.

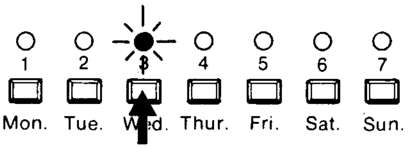


The dots will blink quickly in any of these three conditions:

- The recorder's POWER switch is first turned on.
- Before a power interruption, power has been supplied to the recorder for less than 24 hours. (If power is supplied to the recorder for more than 24 hours before a power interruption, an internal selfcharging battery will be charged and hold the clock and timer settings for about 10 minutes.)
- Power has been interrupted for more than 10 minutes.

**DAY ADJUSTMENT**

The day select buttons – numbered 1 to 7 – should be arranged from left to right in order. Determine by yourself which day corresponds button "1". Suppose today is Wednesday and that you decide that day select button "1" should represent Monday. When setting the clock time, press the button numbered "3" while keeping the CLOCK SET button depressed. The corresponding lamp will light.


1 2 3 4 5 6 7
Mon. Tue. Wed. Thur. Fri. Sat. Sun.

When setting the day the timer is to trigger a recording, press the button which corresponds to the day the recording is to be made, while keeping the PROGRAM button depressed.

At first all the lamps light indicating that the setting is for everyday. When one of the day select buttons is pressed, the lamp corresponding to the button will remain lit and all the other will go out.

To change back the setting to everyday, press the same button again.

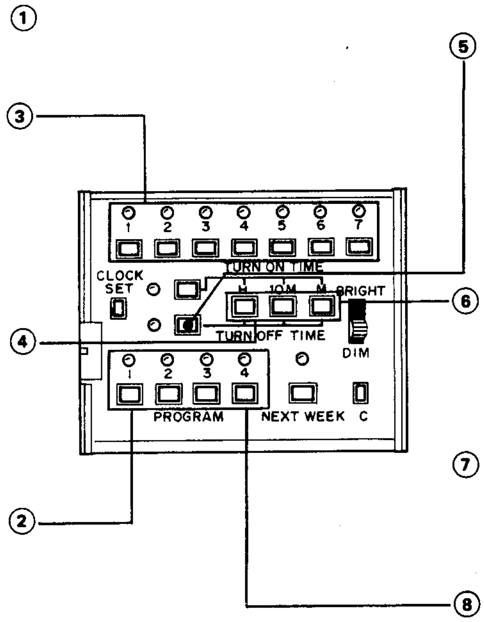
The setting must be either for one day or for everyday.

**NEXT WEEK button**

When the day the timer should trigger a recording is a week later than that day in the present week, press this button.

### 3. TURN-ON/OFF TIME AND DAY SETTINGS FOR TIMER RECORDING

Before proceeding with this setting, set the clock time and day correctly.



Press the TIMER button. ①

Select the day(s) the timer is to trigger a recording. (See "DAY ADJUSTMENT".) Press the NEXT WEEK button, if necessary. ③

Set the time the recording is to be made with the H, 10 MIN and MIN buttons. (In the same manner as the clock time was set.) ④

Press the PROGRAM button to be set and hold it depressed through step ⑦. ②

⑤ Press the TURN OFF TIME button. The lamp will light.

⑥ Set the turn-off time with the H, 10 MIN and MIN buttons.
- If the turn-off time is not set (-:- -), the recording will continue until the tape runs out. The tape will be rewound to the beginning and then stop. The recorder will shut off after 30 seconds.

⑦ Press the appropriate channel select button. The selected channel will be displayed on the channel indicator.

⑧ Release the PROGRAM button when the timer setting is finished. The corresponding lamp lights.

**Note:** When the TIMER button is pressed, the EJECT button cannot operate. To insert a video-cassett, press the ON button and then the EJECT button.

**C (Clear) button**

If this button is pressed while a PROGRAM button is being held down, the memory of that button will be cleared or reset as follows.

| Button | Result |
|---|---|
| Turn-on day | everyday |
| Turn-on time | –:–– (indicating there is no timer setting) |
| Turn-off time | –:–– |
| Channel indicator | 1 |
| NEXT WEEK | no next week setting |

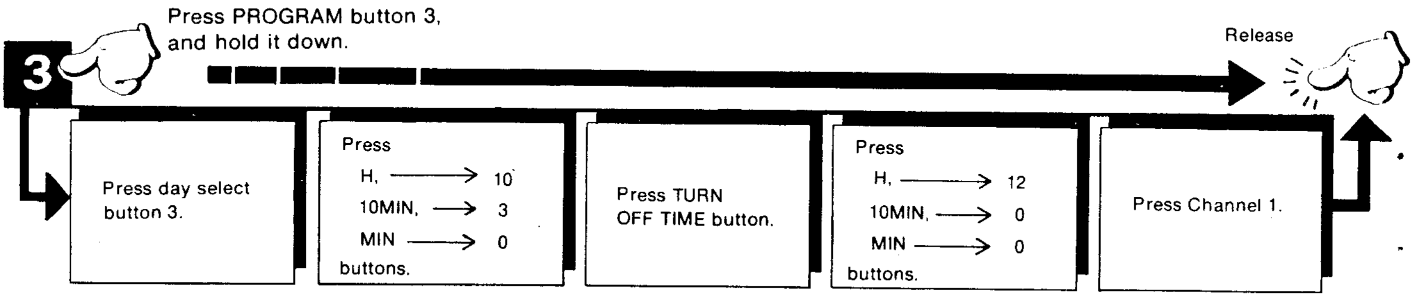
**To check the timer setting**

To check the timer setting, press the PROGRAM button to be checked. To confirm the turn-on time and day(s), press the PROGRAM button. To check the turn-off time, press the TURN OFF TIME button while keeping the PROGRAM button depressed. The channel number is displayed in the channel indicator.

## 4. PROGRAMMING EXAMPLES

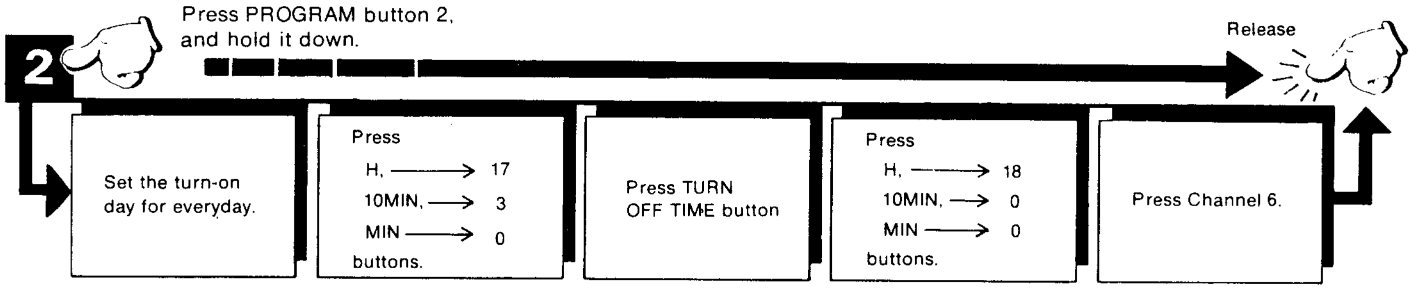
In the following examples, day select button "1" is Monday.

**(1) To programme Wednesday at 10:30 to 12:00, channel 1, on PROGRAM button "3"**


3
Press PROGRAM button 3, and hold it down.
Release
Press day select button 3.
Press H, → 10 10MIN, → 3 MIN → 0 buttons.
Press TURN OFF TIME button.
Press H, → 12 10MIN, → 0 MIN → 0 buttons.
Press Channel 1.

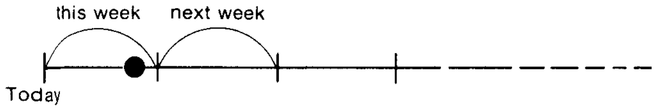
- The timer will trigger a recording every Wednesday at 10:30 to 12:00 if the programming is made on PROGRAM button "1". PROGRAM button "1" is the only button that can trigger a recording on **every subsequent** week.

**(2) Programming everyday at 17:30 to 18:00, Channel 6, on the PROGRAM button "2"**

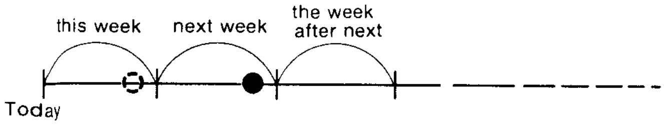

2
Press PROGRAM button 2, and hold it down.
Release
Set the turn-on day for everyday.
Press H, → 17 10MIN, → 3 MIN → 0 buttons.
Press TURN OFF TIME button
Press H, → 18 10MIN, → 0 MIN → 0 buttons.
Press Channel 6.

To sum up the programming procedure:

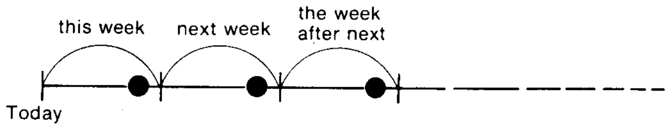
1) **Setting for everyday** can be made on any PROGRAM buttons, as in our previous example (2) .
   In this case, the NEXT WEEK button is ineffective.
2) **Setting for one day** can be made on PROGRAM button 2, 3 and 4. Any settings (day(s), time, channel) will be cleared from the memory after the recording is finished. As in our previous example (1) .


this week
next week
Today

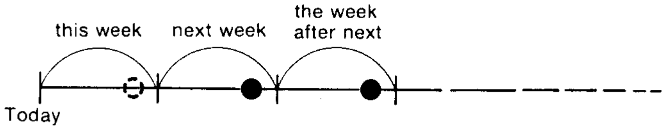
If the NEXT WEEK button is pressed, the turn-on day will be one week later than that day in the present week.


this week
next week
the week after next
Today

3) **Setting for one day, beginning with this week, and continually each week** should be made on PROGRAM button 1.


this week
next week
the week after next
Today

If the NEXT WEEK button is pressed, the recording will start and stop on the day set a week later than that day in the present week, turn on and off on that day at that time every week after that.


this week
next week
the week after next
Today

Once the setting is finished on each PROGRAM button, and the TIMER button is depressed, the lamp associated with the PROGRAM button will light. If the lamps blink, the time and day settings on two PROGRAM buttons overlap.

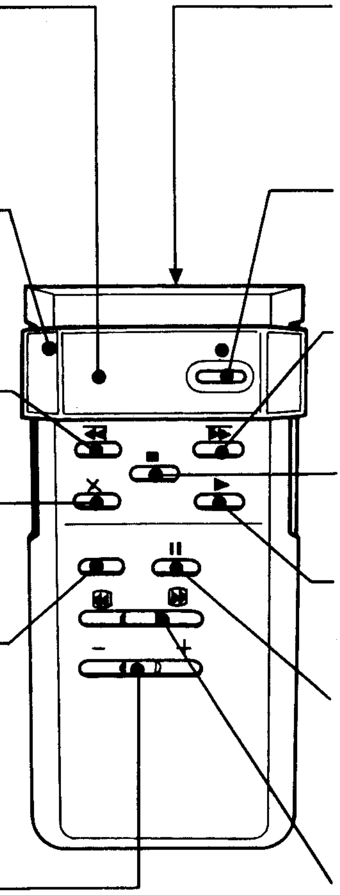
For example: PROGRAM button 1 on Wednesday 8:30 to 9:30
PROGRAM button 2 everyday 8:45 to 9:00

If this happens, reset the timer settings.

## 1-4-10. Remote Control Operation

### FUNCTION OF BUTTONS ON THE REMOTE COMMANDER

The function of the controls on the remote commander is same as on the recorder.



**Indicator**
This lamp blinks when the remote commander is operating. If the lamp does not light when any of the function buttons are pressed, the batteries must be replaced.

**Sliding cover**
During playback, slide this cover over the record button to prevent accidental recording. During recording, slide this cover down to prevent accidental interruption of recording.

**Rewind button [◀◀]**
Press to rewind the tape.

**X3 button**
During playback, press to advance the tape three times faster than normal.

**FRAME button**
For frame-by-frame advance of the tape.
During playback, press ❚❚ button and then the FRAME button.

**Programme search button [PROGR.]**
For selection of the channels. For lower numbered channels, press the [−] side. For higher numbered channels, press [+] side.
Pressing and immediately releasing this button will make a one channel advance.
Keeping this button pressed will advance the channels until the button is released.
Channels, on which the memories are erased in process of the manual channel presetting (see page 43), are skipped.

- During recording, the channel cannot be changed. To change the channel, press the Pause button [❚❚] and then search a desired channel.

**Transmitter**
Point towards the remote control detector on the recorder.

**Record button [ ● ]**
Press to start recording.

**Fast-forward button [▶▶]**
Press to advance the tape rapidly.

**Stop button [ ■ ]**
Press to stop the tape transport.

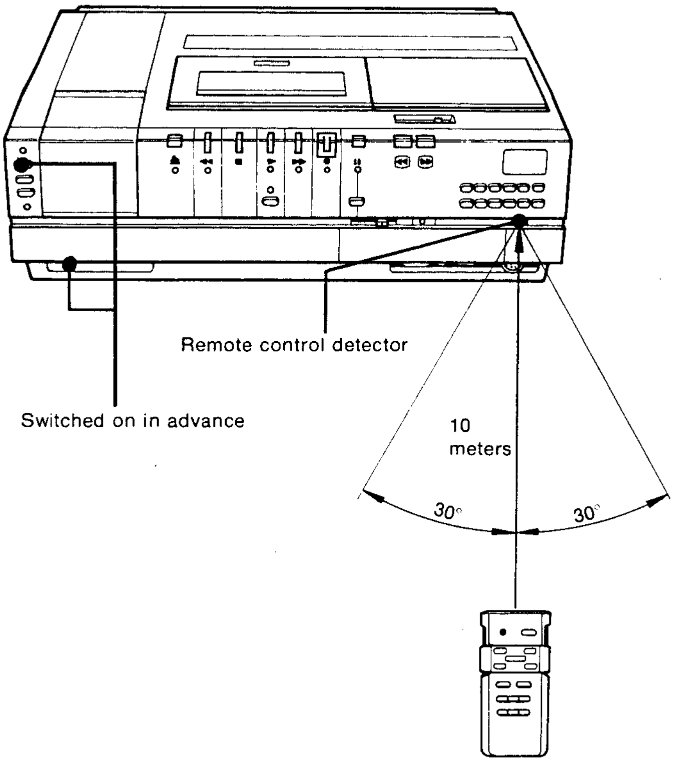
**Playback button [ ▶ ]**
Press to play back the tape.

**Pause button [ ❚❚ ]**
Press to stop the tape for a moment. The pause mode will be released after about 8 minutes

**Picture search button [◀◀ ▶▶]**
For high-speed playback in forward direction, press ▶▶ side. For high-speed playback in reverse direction, press ◀◀ side.

## OPERATION WITH THE REMOTE COMMANDER

Once the POWER button and ON button have been pressed, you can remotely control the recorder with this commander up to 10 meters away from the recorder and within the range illustrated below.

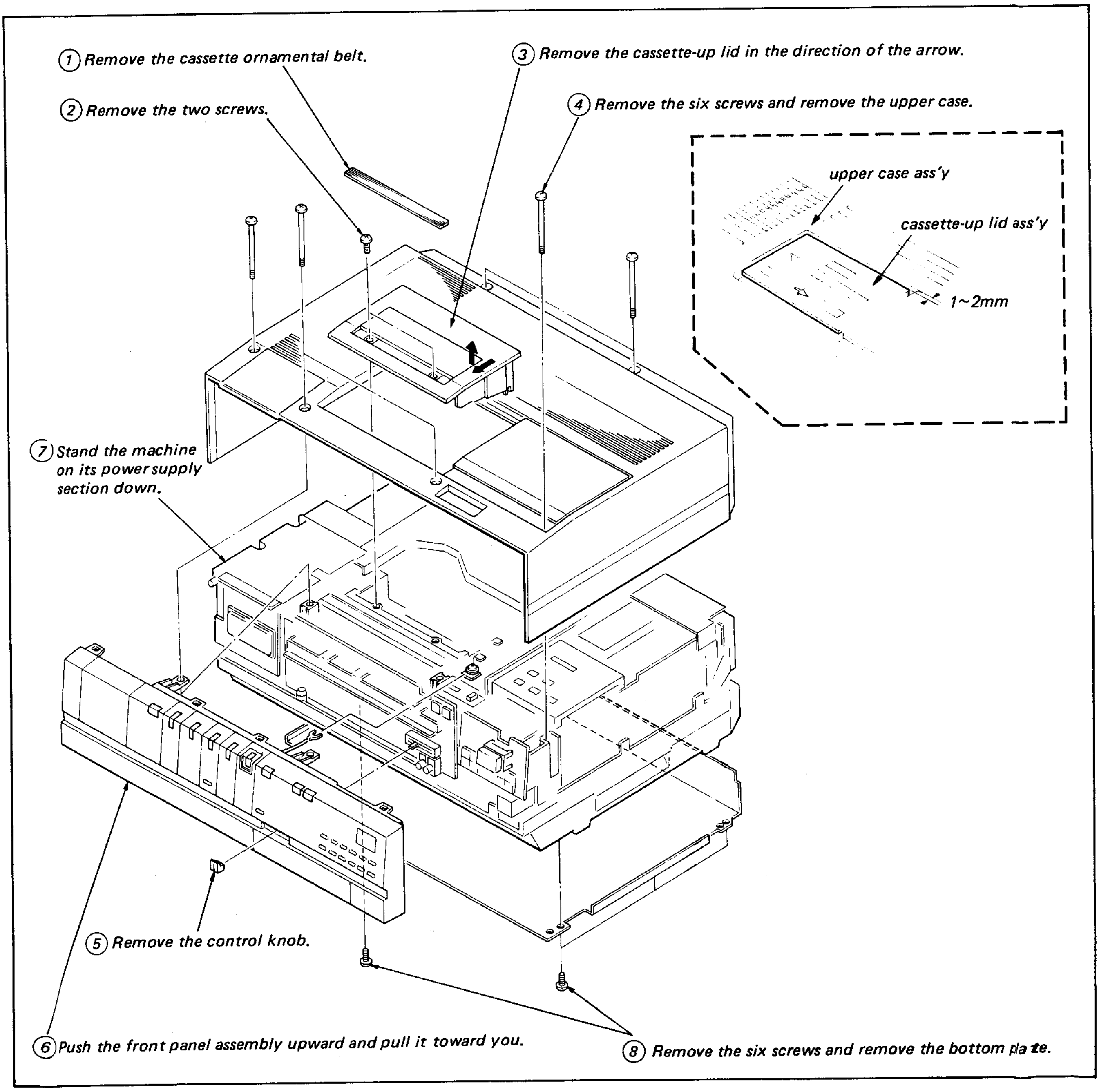

Remote control detector
Switched on in advance
10 meters
30°
30°

**Notes on the remote commander**

- Keep the commander away from extremely hot or humid places.
- Avoid dropping any foreign objects into the commander cabinet, particularly when replacing batteries.
- To avoid a malfunction, do not simultaneously depress two or more buttons.

## 1-5. DISASSEMBLY

### 1-5-1. Cabinet Removal



*① Remove the cassette ornamental belt.*

*② Remove the two screws.*

*③ Remove the cassette-up lid in the direction of the arrow.*

*④ Remove the six screws and remove the upper case.*

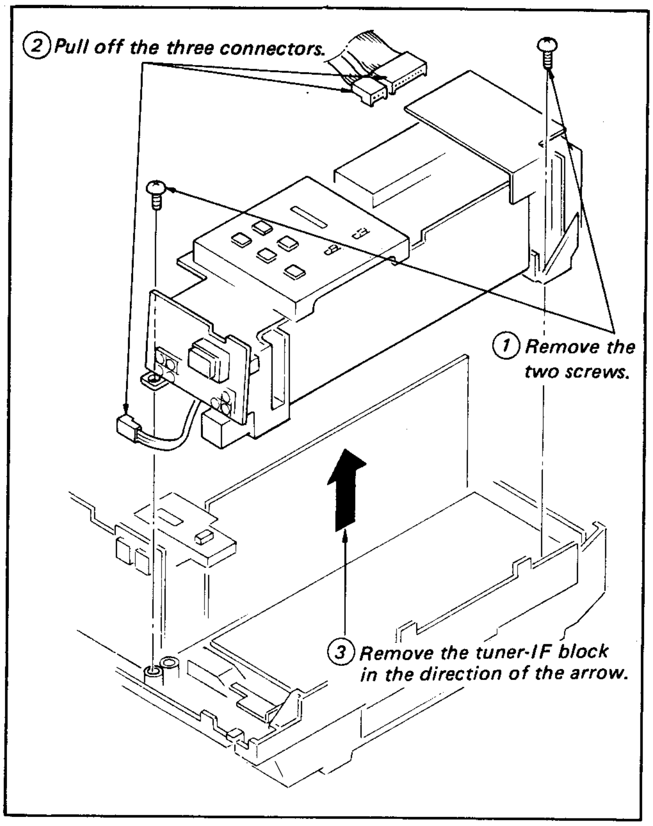
*⑤ Remove the control knob.*

*⑥ Push the front panel assembly upward and pull it toward you.*

*⑦ Stand the machine on its power supply section down.*

*⑧ Remove the six screws and remove the bottom plate.*

### 1-5-2. Tuner-I.F. Block Removal

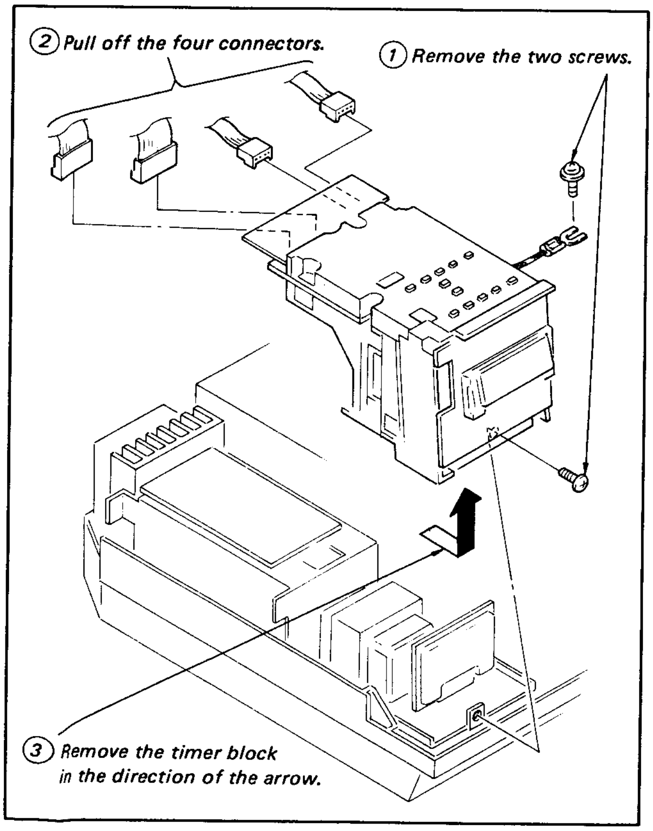


② Pull off the three connectors.

① Remove the two screws.

③ Remove the tuner-IF block in the direction of the arrow.

### 1-5-3. Timer Block Removal

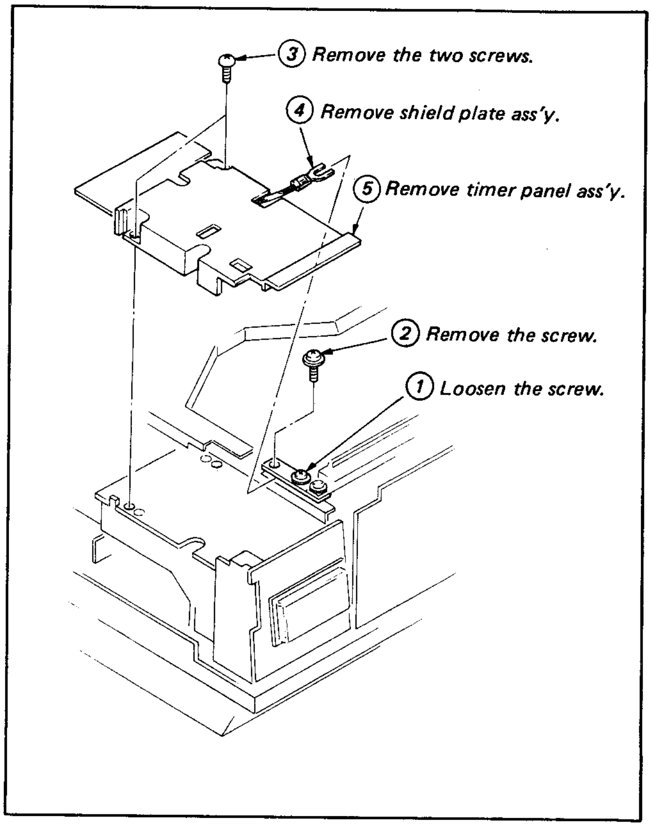


② Pull off the four connectors.

① Remove the two screws.

③ Remove the timer block in the direction of the arrow.

### 1-5-4. Timer Panel Removal



③ Remove the two screws.

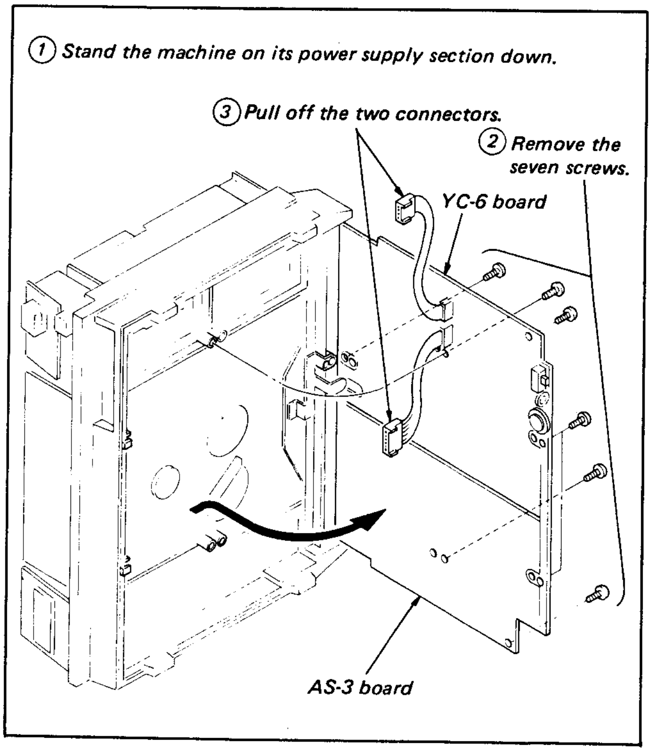
④ Remove shield plate ass'y.

⑤ Remove timer panel ass'y.

② Remove the screw.

① Loosen the screw.

### 1-5-5. Checks of AS-3 and YC-6 Boards

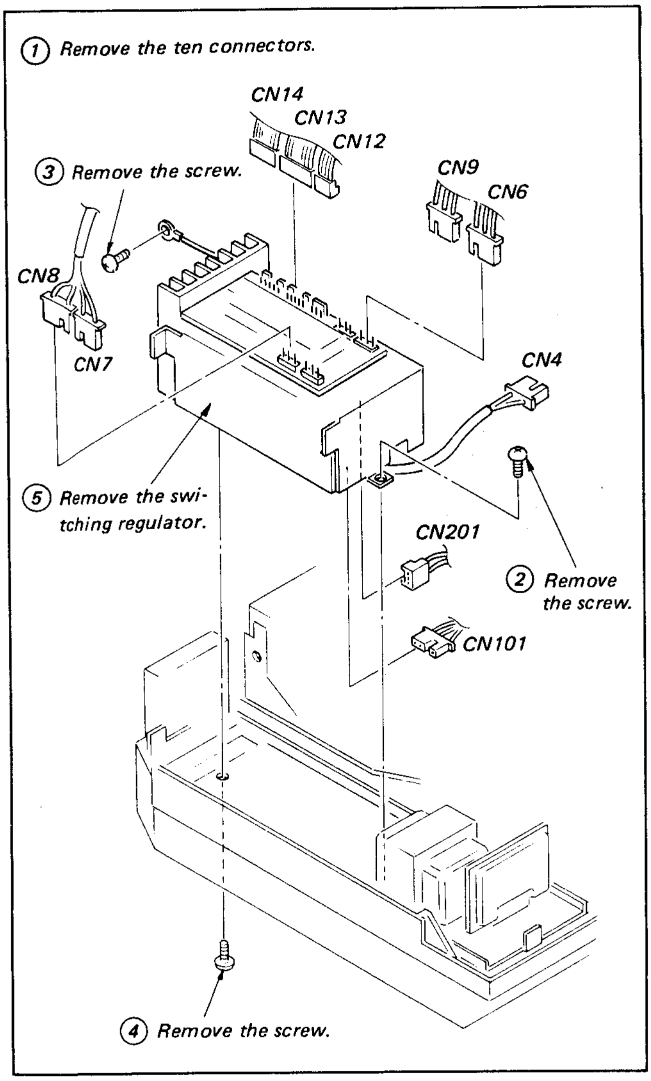


① Stand the machine on its power supply section down.

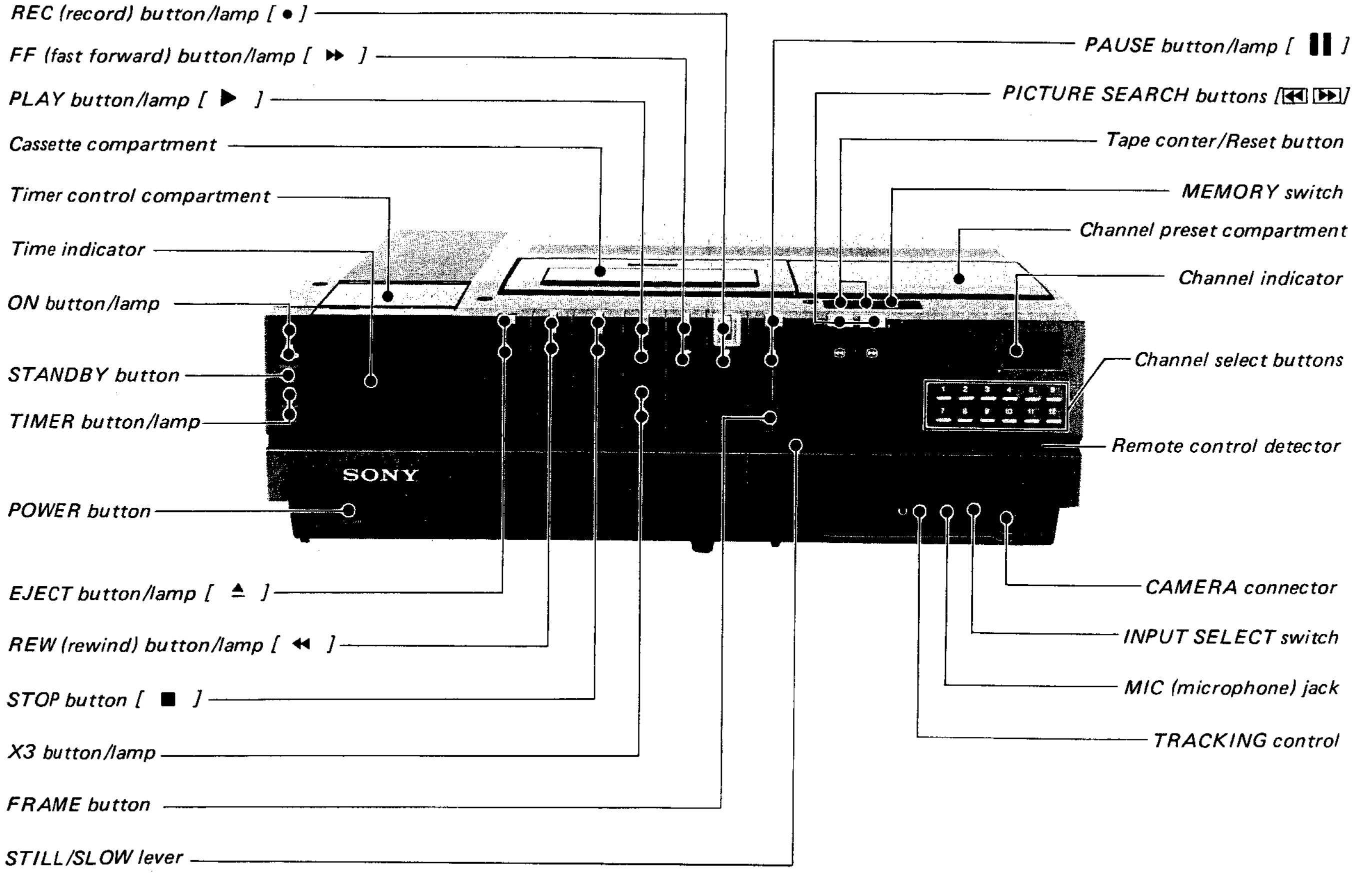
③ Pull off the two connectors.

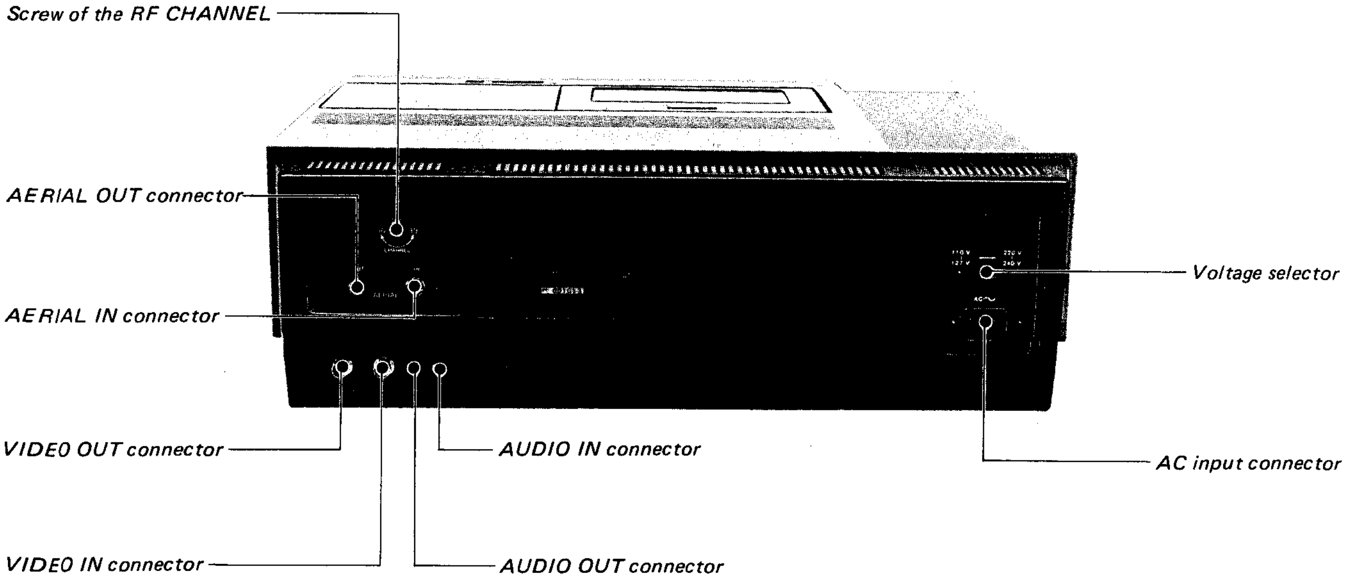
② Remove the seven screws.

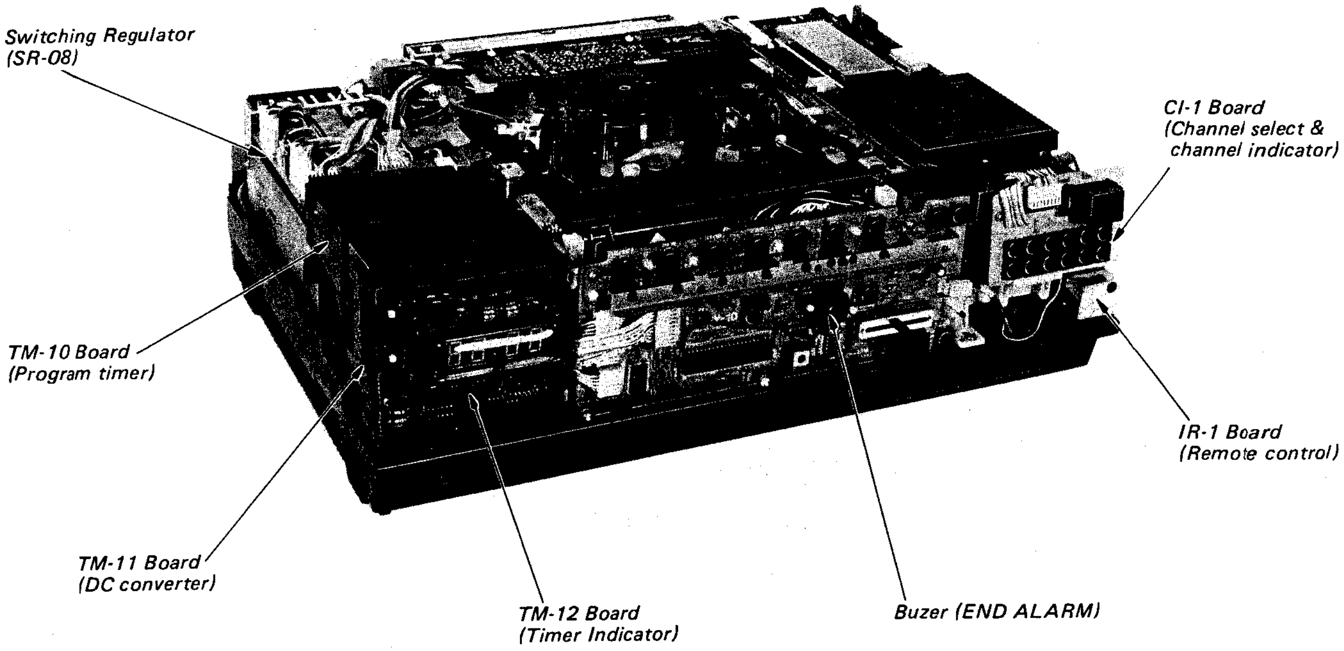
### 1-5-6. Switching Regulator Removal

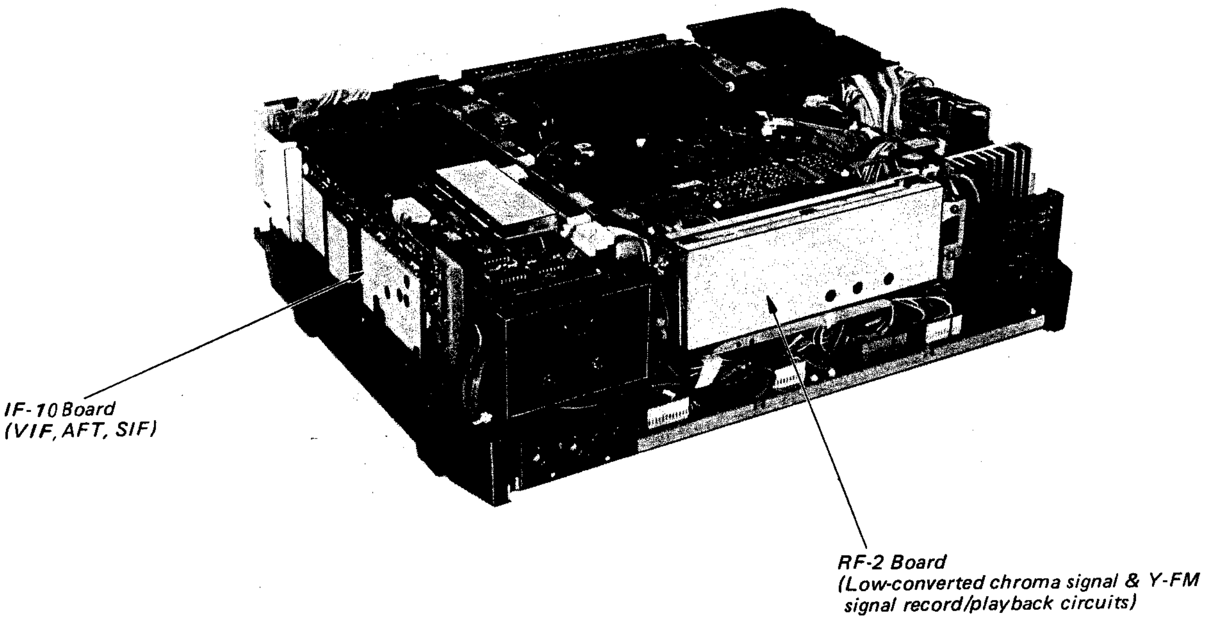

① Remove the ten connectors.
CN14
CN13
CN12
③ Remove the screw.
CN9
CN6
CN8
CN7
CN4
⑤ Remove the switching regulator.
CN201
② Remove the screw.
CN101
④ Remove the screw.

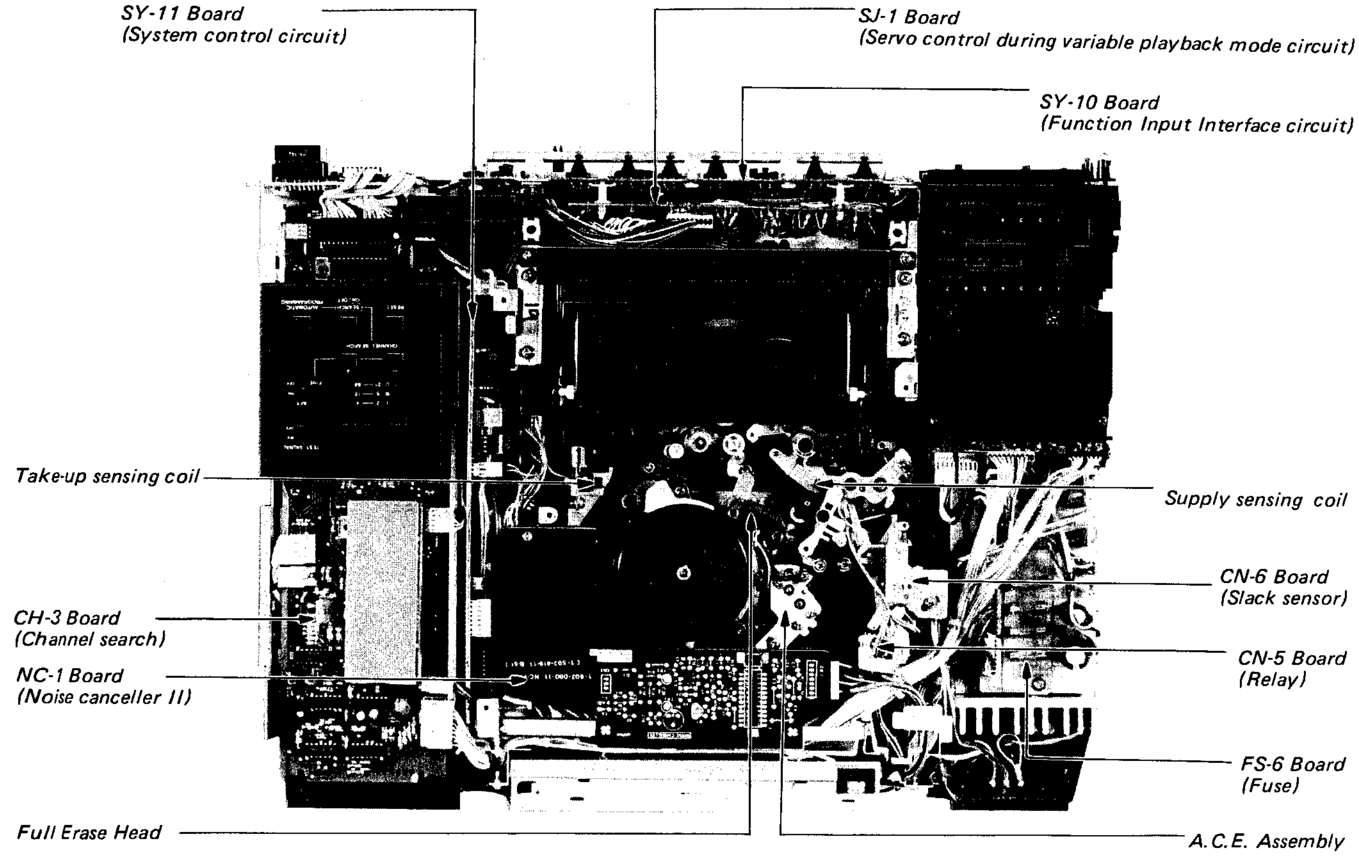
## 1-6. LOCATION OF PARTS AND CONTROLS

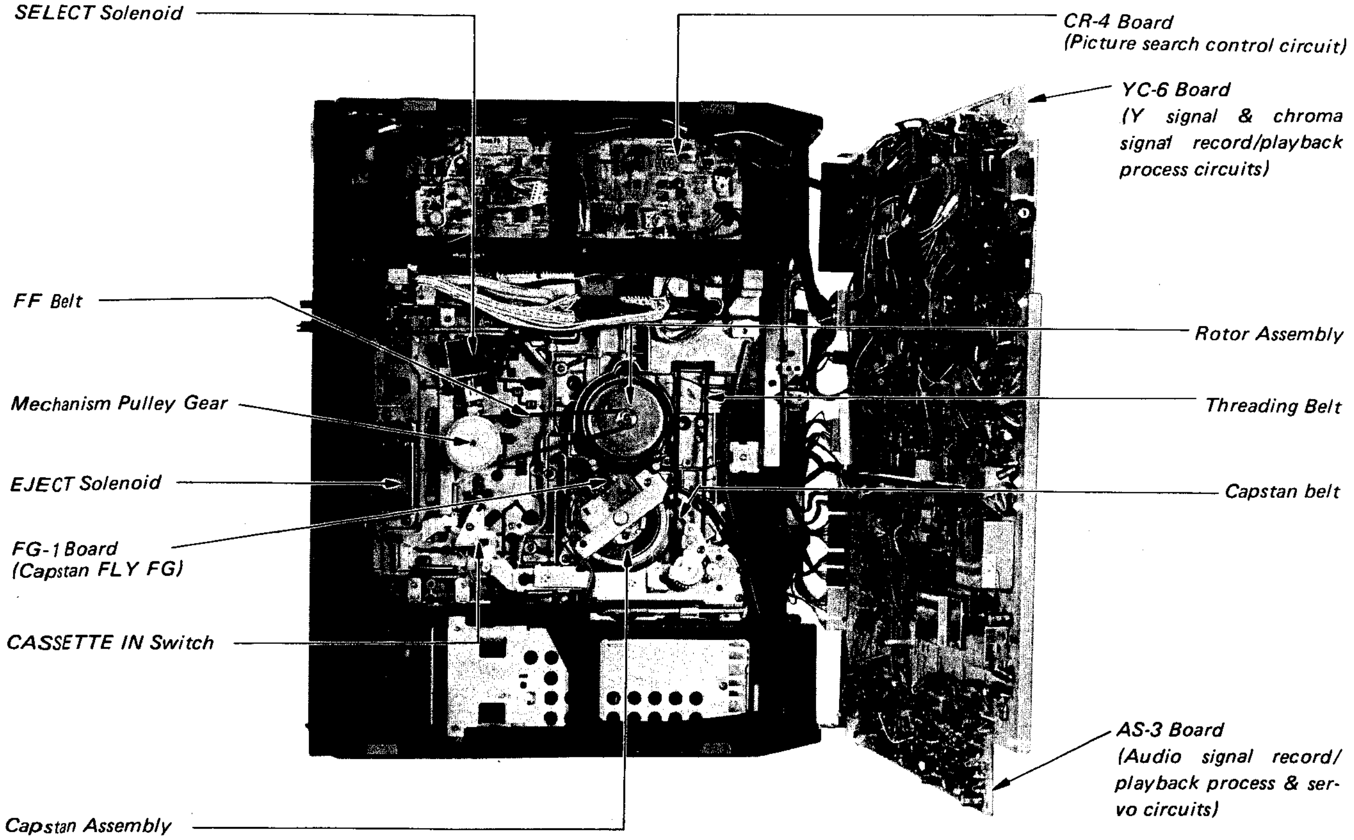

REC (record) button/lamp [ ● ]
FF (fast forward) button/lamp [ ▶▶ ]
PLAY button/lamp [ ▶ ]
Cassette compartment
Timer control compartment
Time indicator
ON button/lamp
STANDBY button
TIMER button/lamp
SONY
POWER button
EJECT button/lamp [ ▲ ]
REW (rewind) button/lamp [ ◀◀ ]
STOP button [ ■ ]
X3 button/lamp
FRAME button
STILL/SLOW lever
PAUSE button/lamp [ ▌▌ ]
PICTURE SEARCH buttons [◀◀ ▶▶]
Tape conter/Reset button
MEMORY switch
Channel preset compartment
Channel indicator
Channel select buttons
Remote control detector
CAMERA connector
INPUT SELECT switch
MIC (microphone) jack
TRACKING control


Screw of the RF CHANNEL
AERIAL OUT connector
AERIAL IN connector
VIDEO OUT connector
VIDEO IN connector
AUDIO IN connector
AUDIO OUT connector
Voltage selector
AC input connector

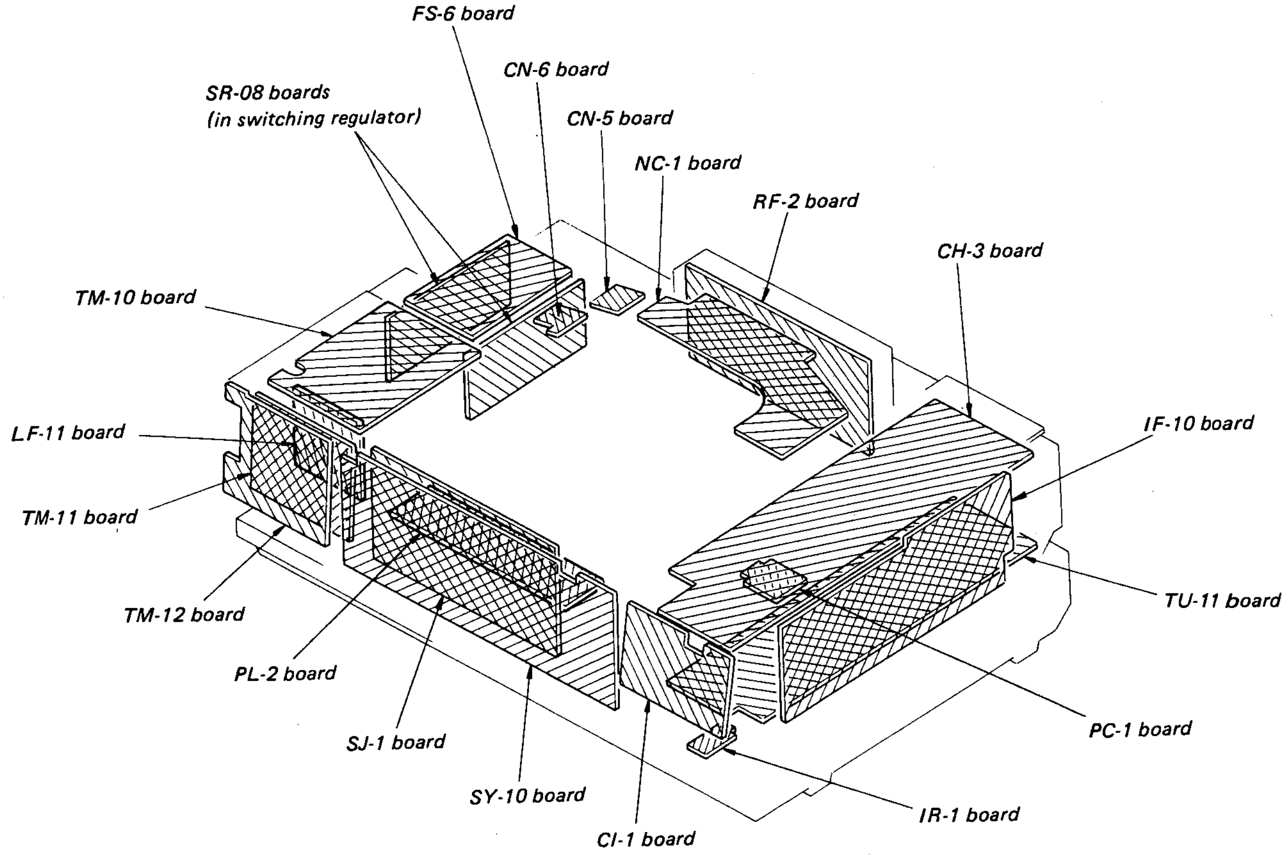

Switching Regulator (SR-08)
CI-1 Board (Channel select & channel indicator)
TM-10 Board (Program timer)
IR-1 Board (Remote control)
TM-11 Board (DC converter)
TM-12 Board (Timer Indicator)
Buzer (END ALARM)

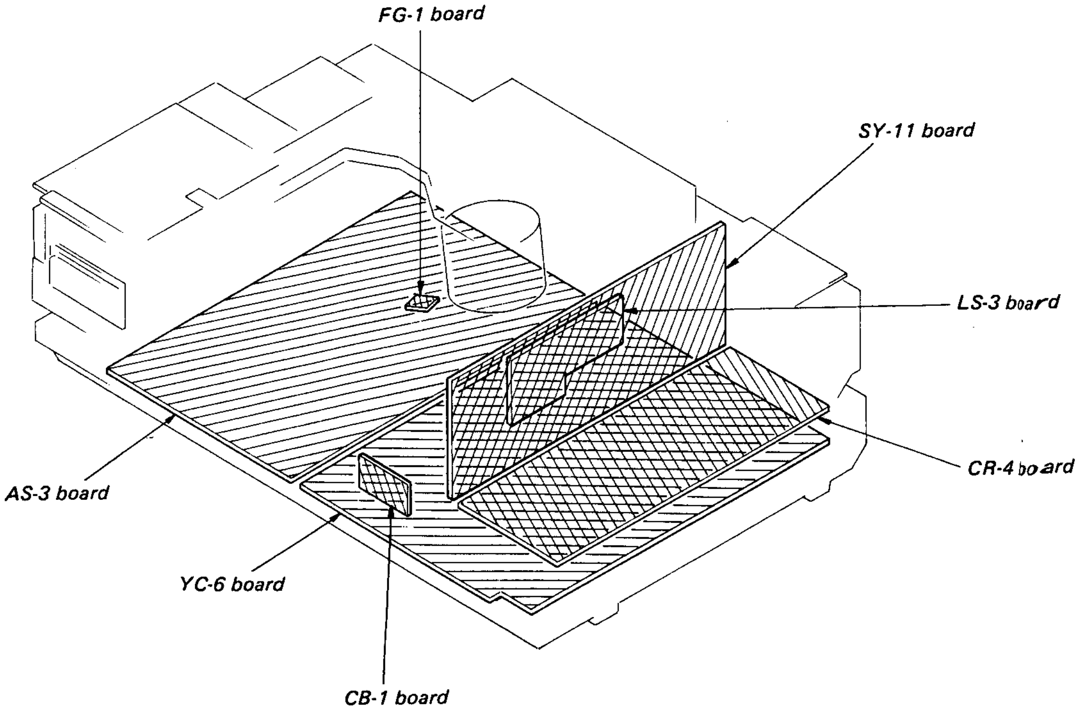

IF-10 Board (VIF, AFT, SIF)
RF-2 Board (Low-converted chroma signal & Y-FM signal record/playback circuits)


SY-11 Board
(System control circuit)
SJ-1 Board
(Servo control during variable playback mode circuit)
SY-10 Board
(Function Input Interface circuit)
Take-up sensing coil
Supply sensing coil
CN-6 Board
(Slack sensor)
CH-3 Board
(Channel search)
NC-1 Board
(Noise canceller II)
CN-5 Board
(Relay)
FS-6 Board
(Fuse)
Full Erase Head
A.C.E. Assembly


SELECT Solenoid
CR-4 Board
(Picture search control circuit)
YC-6 Board
(Y signal & chroma signal record/playback process circuits)
FF Belt
Rotor Assembly
Mechanism Pulley Gear
Threading Belt
EJECT Solenoid
Capstan belt
FG-1 Board
(Capstan FLY FG)
CASSETTE IN Switch
AS-3 Board
(Audio signal record/ playback process & servo circuits)
Capstan Assembly

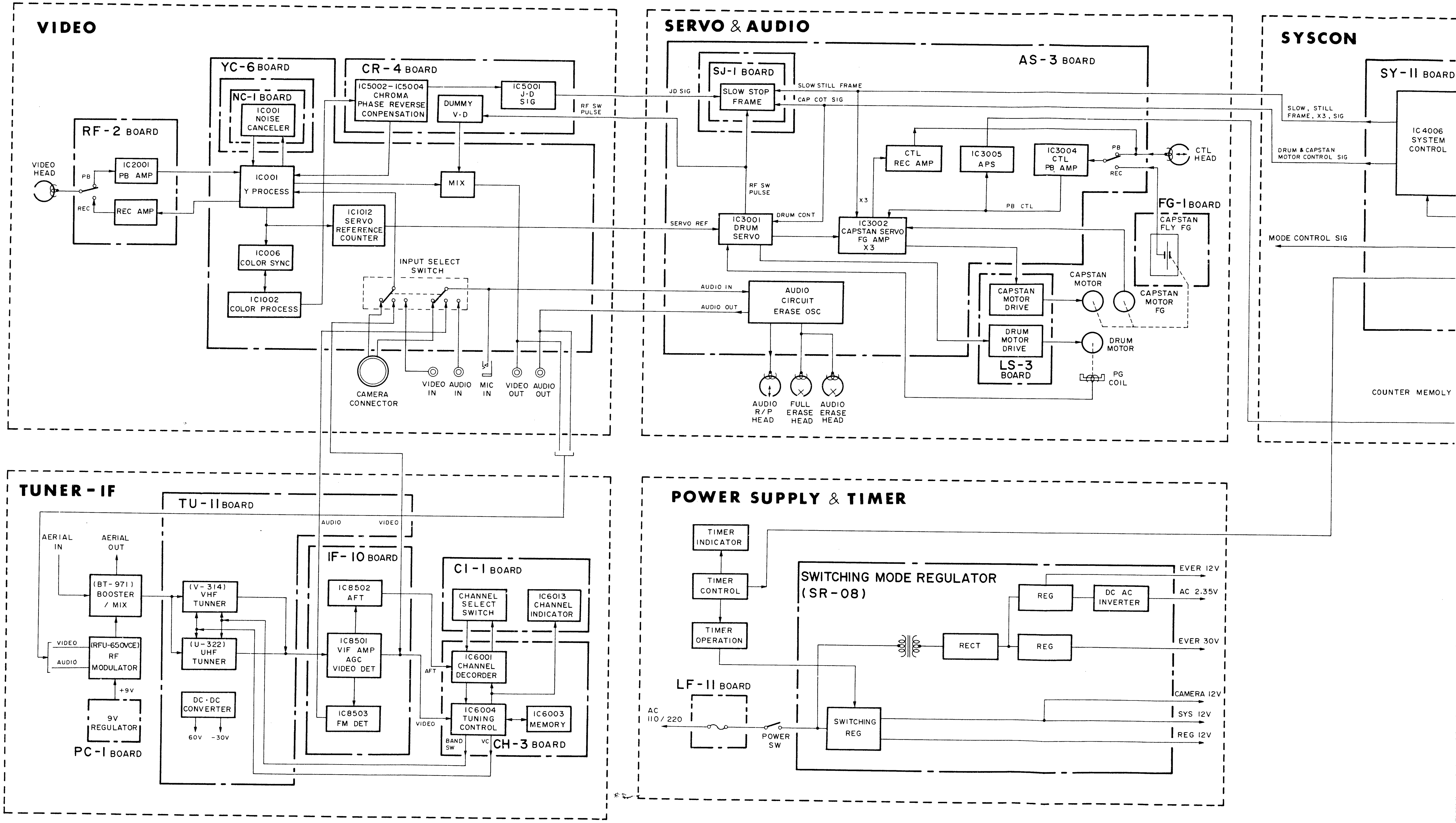
## CIRCUIT BOARDS LOCATION

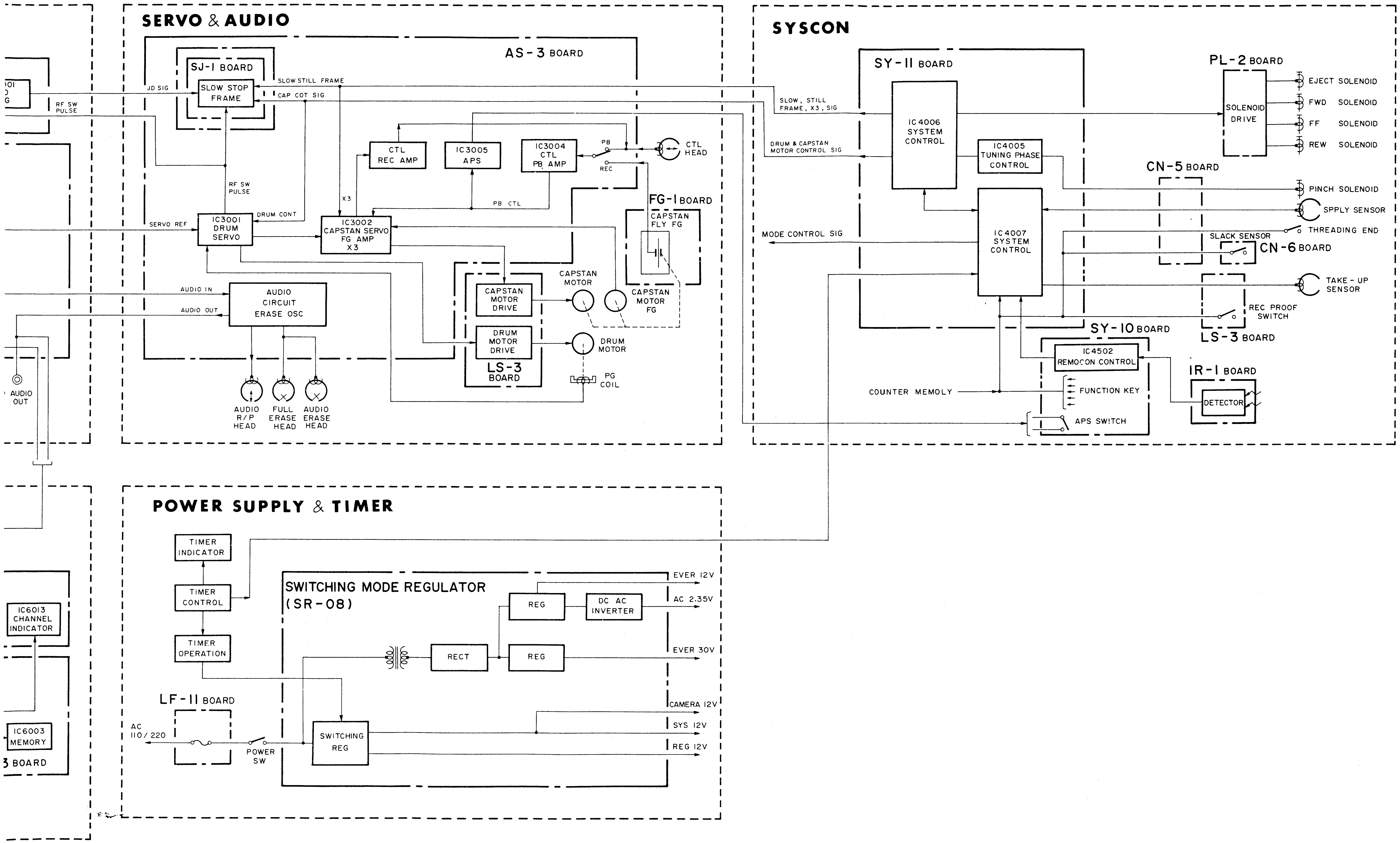

FS-6 board
CN-6 board
SR-08 boards
(in switching regulator)
CN-5 board
NC-1 board
RF-2 board
CH-3 board
TM-10 board
LF-11 board
IF-10 board
TM-11 board
TU-11 board
TM-12 board
PL-2 board
PC-1 board
SJ-1 board
SY-10 board
IR-1 board
CI-1 board


FG-1 board
SY-11 board
LS-3 board
AS-3 board
CR-4 board
YC-6 board
CB-1 board

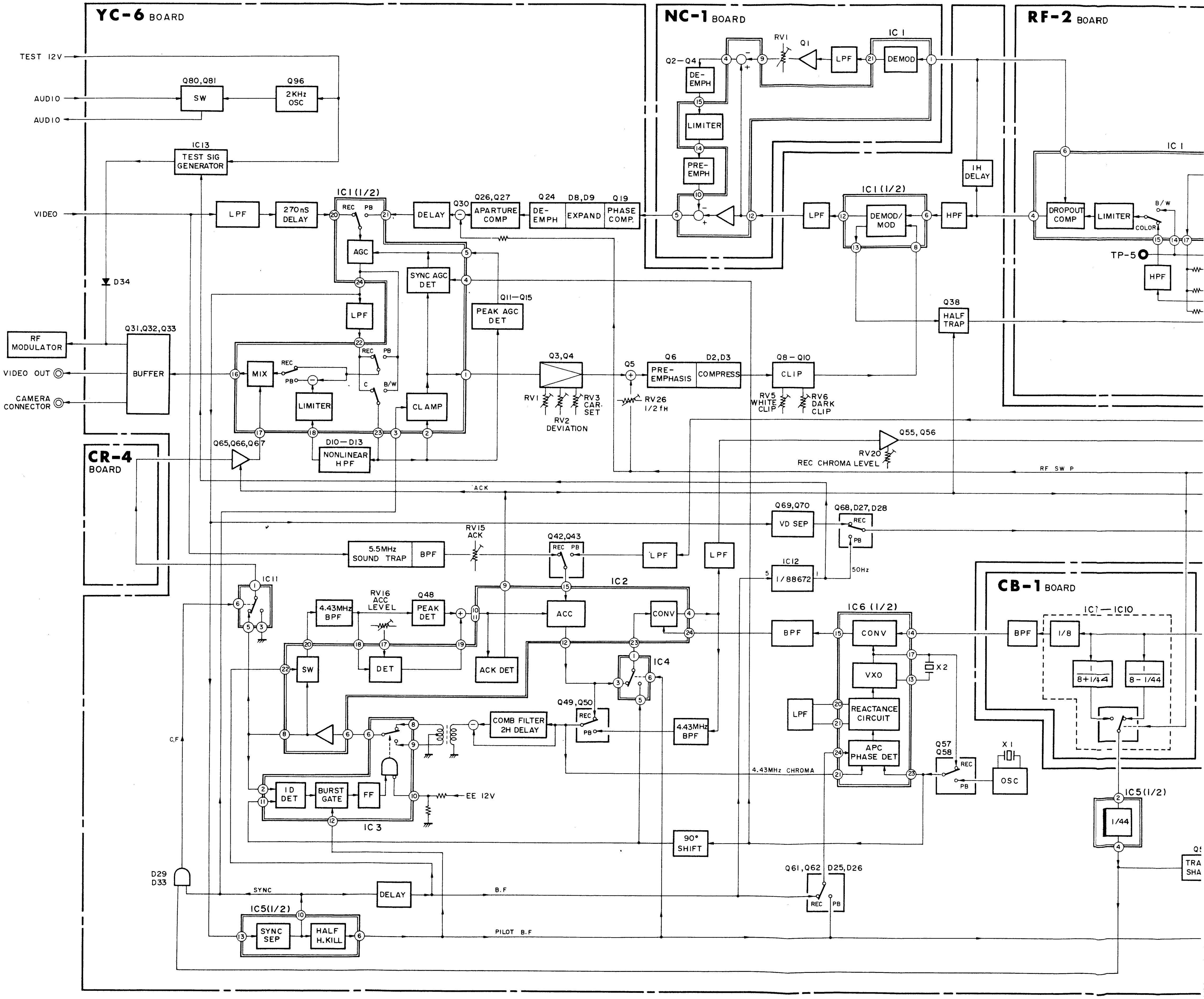
# SECTION 2
# BLOCK DIAGRAMS

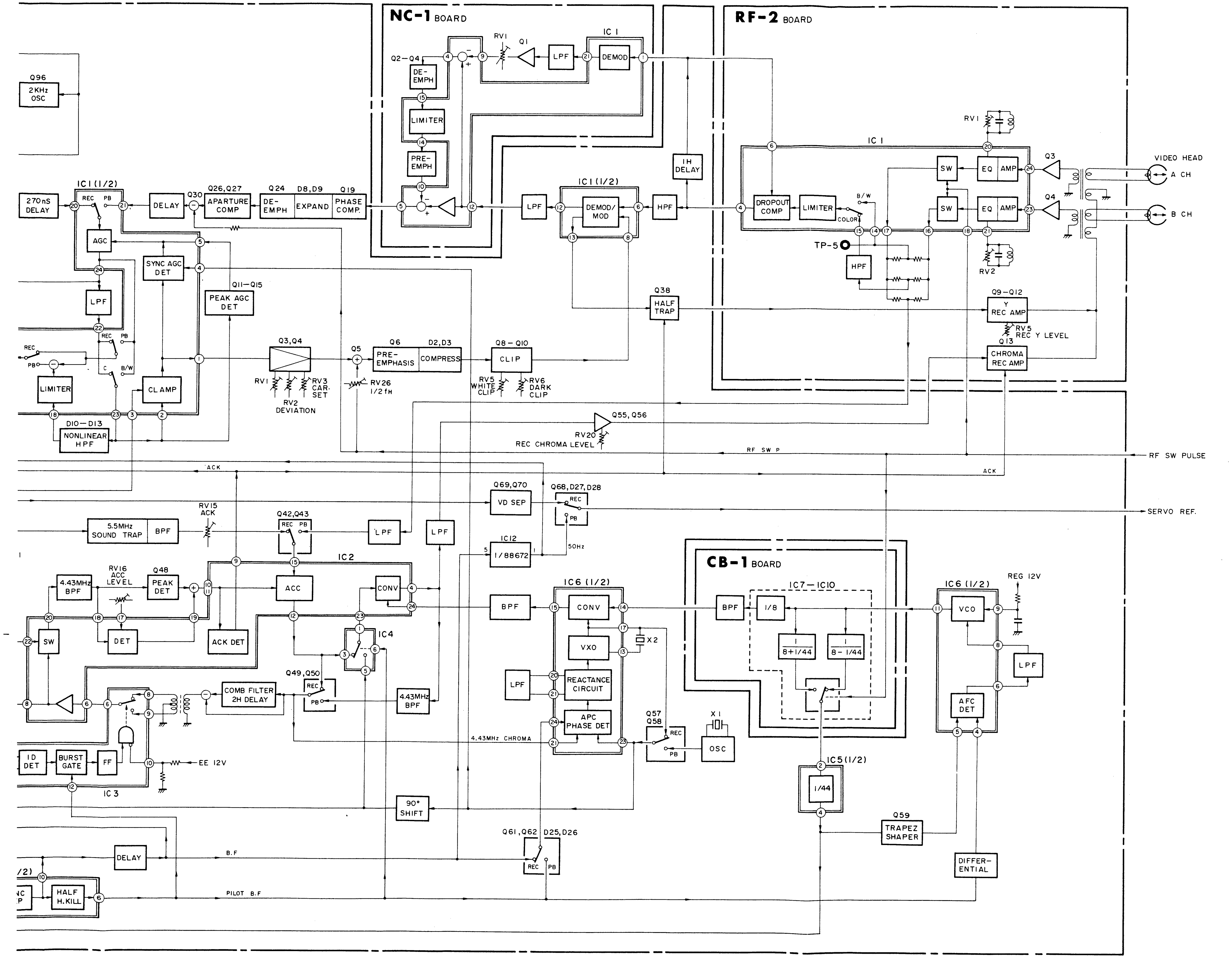
## OVERALL BLOCK DIAGRAM


VIDEO
YC-6 BOARD
NC-1 BOARD
IC001 NOISE CANCELER
CR-4 BOARD
IC5002-IC5004 CHROMA PHASE REVERSE CONPENSATION
DUMMY V-D
IC5001 J-D SIG
RF SW PULSE
RF-2 BOARD
VIDEO HEAD
PB
REC
IC2001 PB AMP
REC AMP
IC001 Y PROCESS
MIX
IC1012 SERVO REFERENCE COUNTER
IC006 COLOR SYNC
IC1002 COLOR PROCESS
INPUT SELECT SWITCH
CAMERA CONNECTOR
VIDEO IN
AUDIO IN
MIC IN
VIDEO OUT
AUDIO OUT
SERVO & AUDIO
AS-3 BOARD
SJ-1 BOARD
JD SIG
SLOW STOP FRAME
SLOW STILL FRAME
CAP COT SIG
CTL REC AMP
IC3005 APS
IC3004 CTL PB AMP
PB
REC
CTL HEAD
RF SW PULSE
DRUM CONT
X3
PB CTL
SERVO REF
IC3001 DRUM SERVO
IC3002 CAPSTAN SERVO FG AMP X3
FG-1 BOARD
CAPSTAN FLY FG
AUDIO IN
AUDIO OUT
AUDIO CIRCUIT ERASE OSC
CAPSTAN MOTOR DRIVE
DRUM MOTOR DRIVE
LS-3 BOARD
CAPSTAN MOTOR
CAPSTAN MOTOR FG
DRUM MOTOR
PG COIL
AUDIO R/P HEAD
FULL ERASE HEAD
AUDIO ERASE HEAD
SYSCON
SY-11 BOARD
SLOW, STILL FRAME, X3, SIG
DRUM & CAPSTAN MOTOR CONTROL SIG
IC4006 SYSTEM CONTROL
MODE CONTROL SIG
COUNTER MEMOLY
TUNER-IF
TU-11 BOARD
AUDIO
VIDEO
AERIAL IN
AERIAL OUT
(BT-971) BOOSTER / MIX
VIDEO
AUDIO
(RFU-650VCE) RF MODULATOR
+9V
9V REGULATOR
PC-1 BOARD
(V-314) VHF TUNNER
(U-322) UHF TUNNER
DC-DC CONVERTER
60V
-30V
IF-10 BOARD
IC8502 AFT
IC8501 VIF AMP AGC VIDEO DET
IC8503 FM DET
CI-1 BOARD
CHANNEL SELECT SWITCH
IC6013 CHANNEL INDICATOR
AFT
IC6001 CHANNEL DECORDER
VIDEO
IC6004 TUNING CONTROL
IC6003 MEMORY
BAND SW
VC
CH-3 BOARD
POWER SUPPLY & TIMER
TIMER INDICATOR
TIMER CONTROL
TIMER OPERATION
SWITCHING MODE REGULATOR (SR-08)
REG
DC AC INVERTER
RECT
REG
EVER 12V
AC 2.35V
EVER 30V
LF-11 BOARD
AC 110/220
POWER SW
SWITCHING REG
CAMERA 12V
SYS 12V
REG 12V

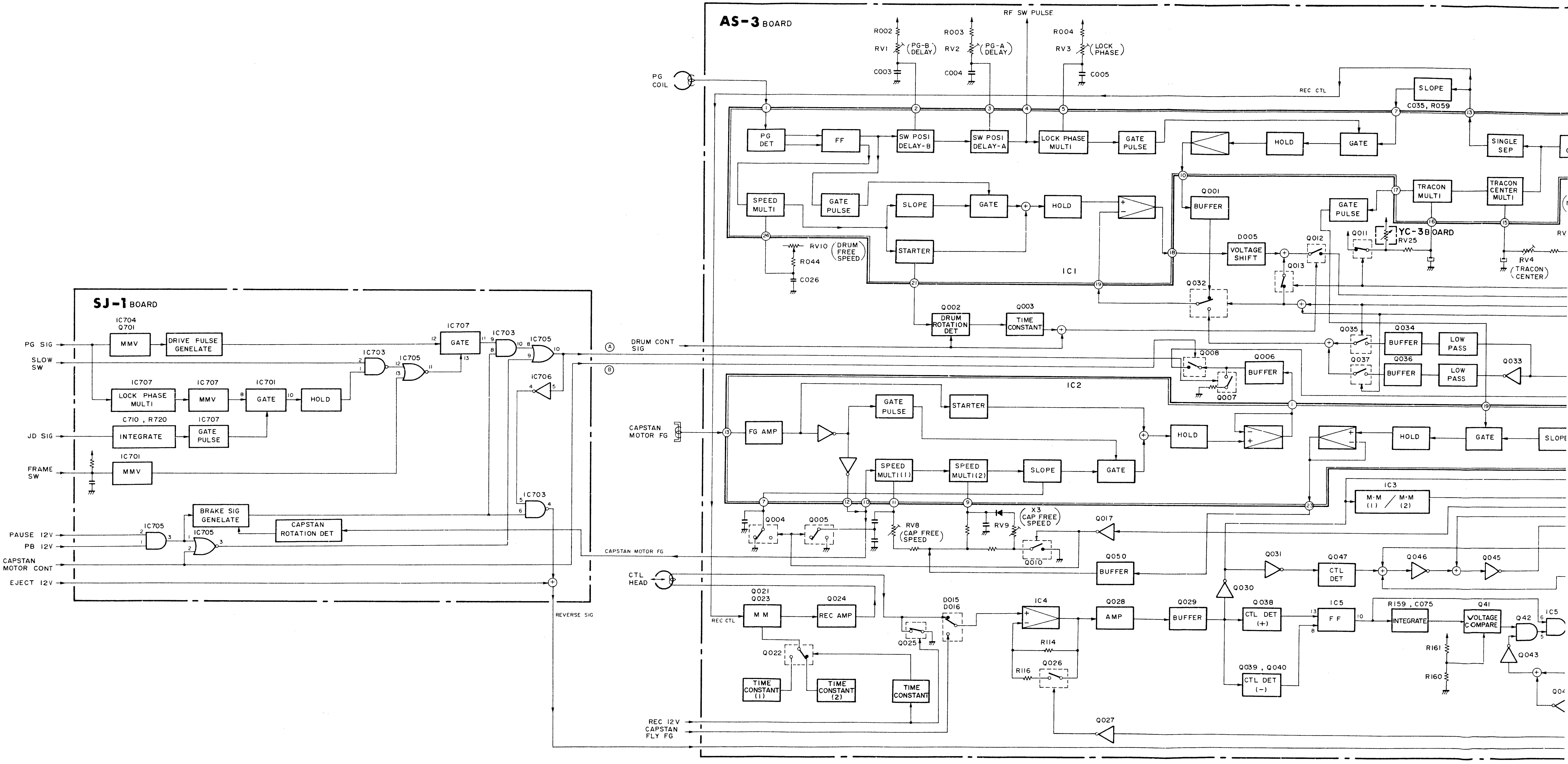

SERVO & AUDIO
AS-3 BOARD
SJ-1 BOARD
SLOW STOP FRAME
JD SIG
RF SW PULSE
SLOW STILL FRAME
CAP COT SIG
CTL REC AMP
IC3005 APS
IC3004 CTL PB AMP
PB
REC
CTL HEAD
FG-1 BOARD
CAPSTAN FLY FG
X3
PB CTL
DRUM CONT
SERVO REF
IC3001 DRUM SERVO
IC3002 CAPSTAN SERVO FG AMP X3
CAPSTAN MOTOR
CAPSTAN MOTOR DRIVE
CAPSTAN MOTOR FG
DRUM MOTOR DRIVE
DRUM MOTOR
LS-3 BOARD
PG COIL
AUDIO IN
AUDIO OUT
AUDIO CIRCUIT ERASE OSC
AUDIO R/P HEAD
FULL ERASE HEAD
AUDIO ERASE HEAD
AUDIO OUT
SYSCON
SY-11 BOARD
SLOW, STILL FRAME, X3, SIG
DRUM & CAPSTAN MOTOR CONTROL SIG
IC4006 SYSTEM CONTROL
IC4005 TUNING PHASE CONTROL
IC4007 SYSTEM CONTROL
MODE CONTROL SIG
PL-2 BOARD
SOLENOID DRIVE
EJECT SOLENOID
FWD SOLENOID
FF SOLENOID
REW SOLENOID
CN-5 BOARD
PINCH SOLENOID
SPPLY SENSOR
THREADING END
SLACK SENSOR
CN-6 BOARD
TAKE-UP SENSOR
REC PROOF SWITCH
LS-3 BOARD
SY-10 BOARD
IC4502 REMOCON CONTROL
FUNCTION KEY
APS SWITCH
COUNTER MEMOLY
IR-1 BOARD
DETECTOR
POWER SUPPLY & TIMER
TIMER INDICATOR
TIMER CONTROL
TIMER OPERATION
SWITCHING MODE REGULATOR (SR-08)
REG
DC AC INVERTER
RECT
REG
SWITCHING REG
EVER 12V
AC 2.35V
EVER 30V
CAMERA 12V
SYS 12V
REG 12V
LF-11 BOARD
AC 110/220
POWER SW
IC6013 CHANNEL INDICATOR
IC6003 MEMORY
3 BOARD

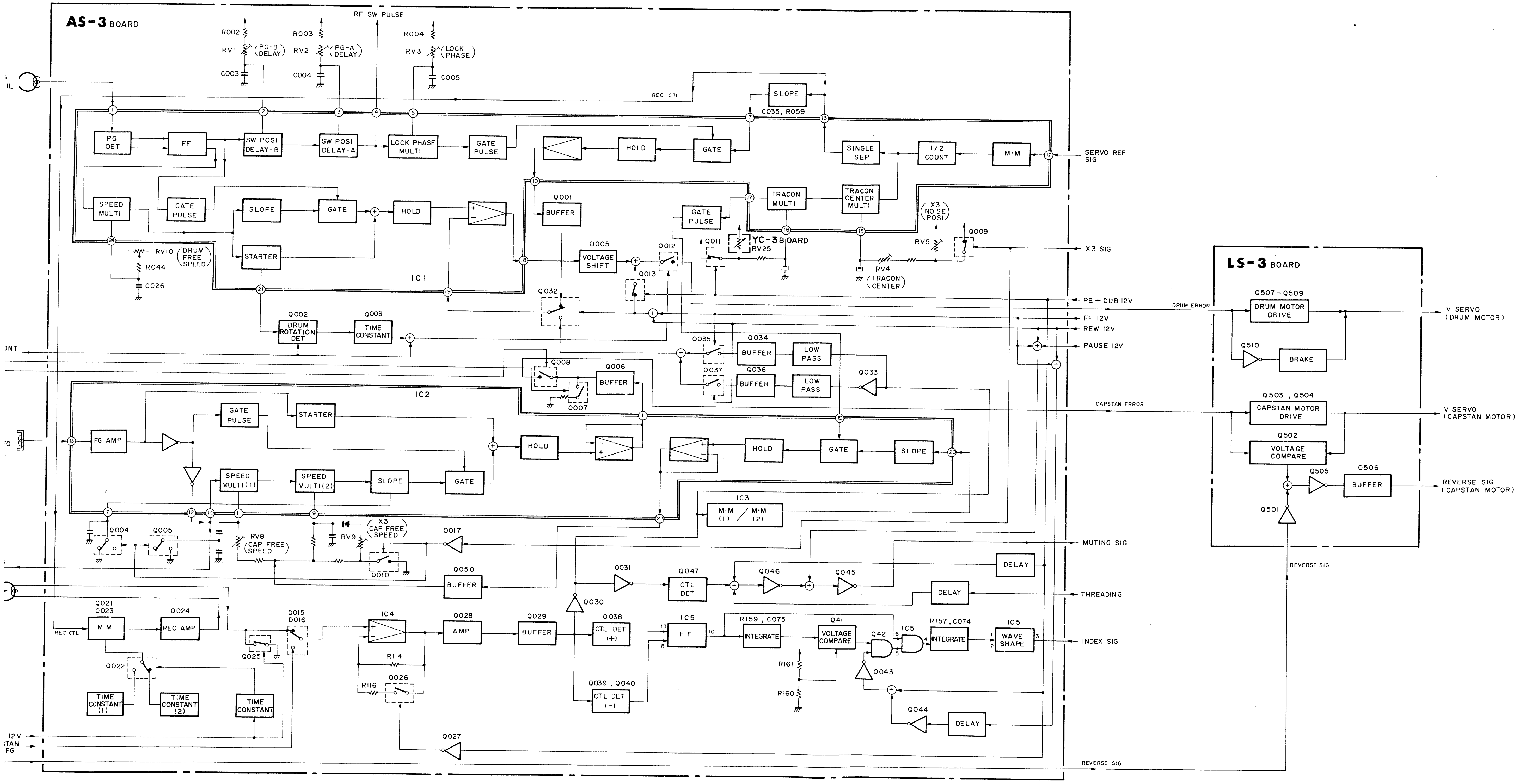
## VIDEO SYSTEM BLOCK DIAGRAM


YC-6 BOARD
TEST 12V
AUDIO
AUDIO
Q80,Q81
SW
Q96
2KHz OSC
IC13
TEST SIG GENERATOR
VIDEO
LPF
270nS DELAY
IC1(1/2)
REC PB
AGC
DELAY
Q30
Q26,Q27
APARTURE COMP
Q24
DE-EMPH
D8,D9
EXPAND
Q19
PHASE COMP.
SYNC AGC DET
Q11—Q15
PEAK AGC DET
LPF
D34
RF MODULATOR
Q31,Q32,Q33
BUFFER
VIDEO OUT
CAMERA CONNECTOR
MIX
REC
PB
LIMITER
C
B/W
CLAMP
Q3,Q4
RV1
RV2 DEVIATION
RV3 CAR. SET
Q5
RV26 1/2fH
Q6
PRE-EMPHASIS
D2,D3
COMPRESS
Q8—Q10
CLIP
RV5 WHITE CLIP
RV6 DARK CLIP
CR-4 BOARD
Q65,Q66,Q67
D10—D13
NONLINEAR HPF
Q55,Q56
RV20
REC CHROMA LEVEL
RF SW P
ACK
Q69,Q70
VD SEP
Q68,D27,D28
REC
PB
5.5MHz SOUND TRAP
BPF
RV15 ACK
Q42,Q43
REC PB
LPF
LPF
IC12
1/88672
50Hz
IC11
IC2
4.43MHz BPF
RV16 ACC LEVEL
Q48
PEAK DET
ACC
CONV
SW
DET
ACK DET
IC4
Q49,Q50
REC
PB
COMB FILTER 2H DELAY
4.43MHz BPF
C.F
ID DET
BURST GATE
FF
IC3
EE 12V
90° SHIFT
D29
D33
SYNC
DELAY
B.F
IC5(1/2)
SYNC SEP
HALF H.KILL
PILOT B.F
Q61,Q62 D25,D26
REC PB
NC-1 BOARD
Q2—Q4
DE-EMPH
LIMITER
PRE-EMPH
RV1
Q1
LPF
IC1
DEMOD
IC1(1/2)
DEMOD/MOD
HPF
LPF
1H DELAY
Q38
HALF TRAP
IC6(1/2)
BPF
CONV
VXO
X2
LPF
REACTANCE CIRCUIT
APC PHASE DET
4.43MHz CHROMA
Q57
Q58
REC
PB
X1
OSC
RF-2 BOARD
IC1
DROPOUT COMP
LIMITER
B/W
COLOR
TP-5
HPF
CB-1 BOARD
IC1—IC10
BPF
1/8
1/8+1/44
1/8−1/44
IC5(1/2)
1/44
Q5
TRA
SHA

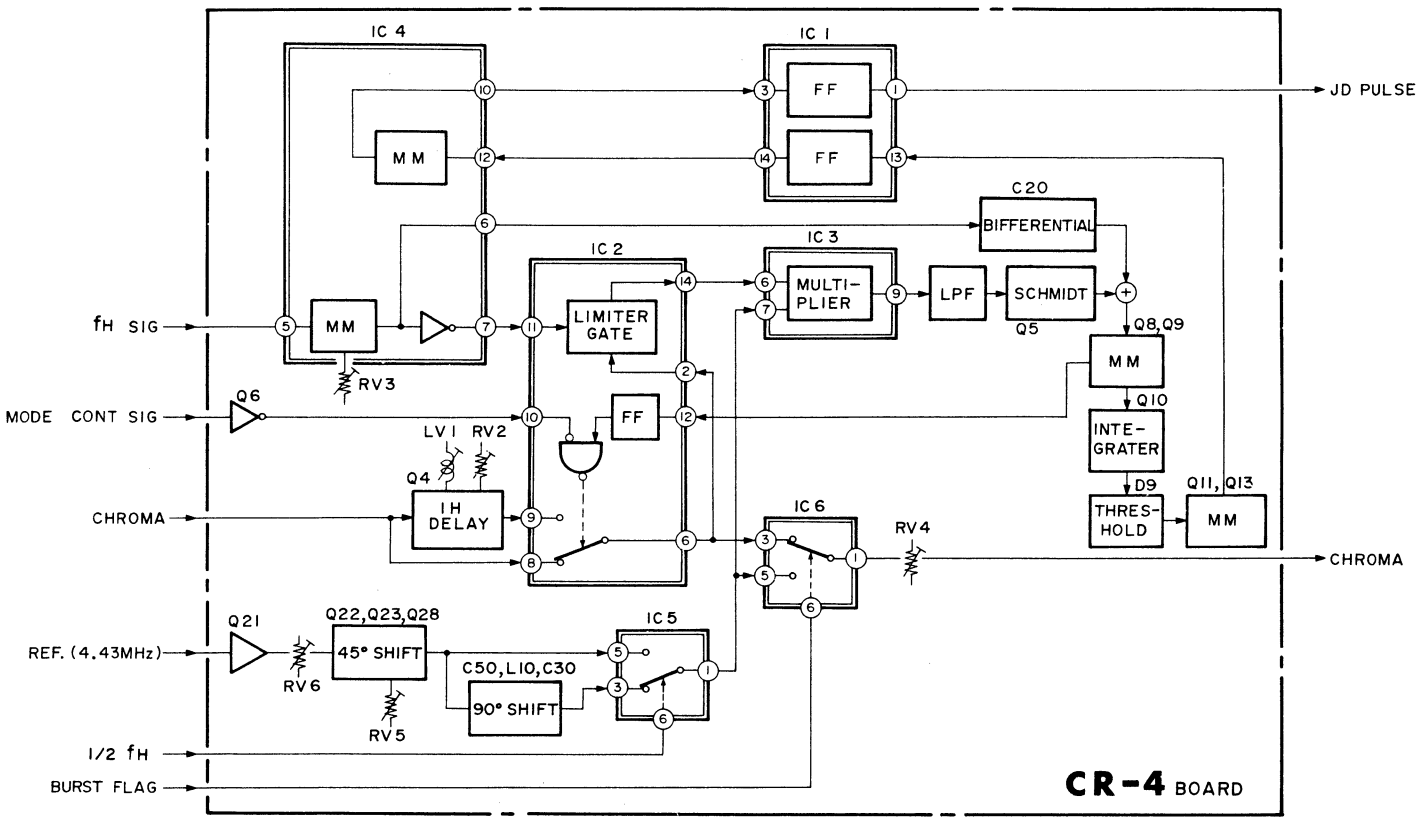

NC-1 BOARD
RF-2 BOARD
CB-1 BOARD
Q96
2KHz OSC
270nS DELAY
IC1 (1/2)
REC PB
AGC
LPF
SYNC AGC DET
PEAK AGC DET
Q11—Q15
CLAMP
LIMITER
D10—D13
NONLINEAR HPF
DELAY
Q30
Q26,Q27
APARTURE COMP
Q24
DE-EMPH
D8,D9
EXPAND
Q19
PHASE COMP.
Q2—Q4
DE-EMPH
LIMITER
PRE-EMPH
RV1
Q1
LPF
IC 1
DEMOD
IC1 (1/2)
DEMOD/MOD
HPF
1H DELAY
Q3,Q4
RV1
RV2
DEVIATION
RV3
CAR. SET
Q5
RV26
1/2 fH
Q6
PRE-EMPHASIS
D2,D3
COMPRESS
Q8—Q10
CLIP
RV5
WHITE CLIP
RV6
DARK CLIP
Q38
HALF TRAP
IC 1
DROPOUT COMP
LIMITER
B/W
COLOR
TP-5
HPF
SW
EQ
AMP
Q3
Q4
RV1
RV2
VIDEO HEAD
A CH
B CH
Q9—Q12
Y REC AMP
RV5
REC Y LEVEL
Q13
CHROMA REC AMP
Q55, Q56
RV20
REC CHROMA LEVEL
RF SW P
RF SW PULSE
ACK
Q69,Q70
VD SEP
Q68,D27,D28
REC
PB
SERVO REF.
5.5MHz SOUND TRAP
BPF
RV15
ACK
Q42,Q43
LPF
LPF
IC12
1/88672
50Hz
IC2
4.43MHz BPF
RV16
ACC LEVEL
Q48
PEAK DET
ACC
CONV
DET
ACK DET
SW
IC4
Q49,Q50
COMB FILTER 2H DELAY
4.43MHz BPF
ID DET
BURST GATE
FF
IC 3
EE 12V
BPF
IC6 (1/2)
CONV
VXO
X2
LPF
REACTANCE CIRCUIT
APC PHASE DET
4.43MHz CHROMA
Q57
Q58
X1
OSC
90° SHIFT
Q61,Q62
D25,D26
DELAY
B.F
PILOT B.F
HALF H.KILL
BPF
IC7—IC10
1/8
1/8+1/44
1/8−1/44
IC5 (1/2)
1/44
Q59
TRAPEZ SHAPER
IC6 (1/2)
REG 12V
VCO
LPF
AFC DET
DIFFER-ENTIAL

## SERVO SYSTEM BLOCK DIAGRAM

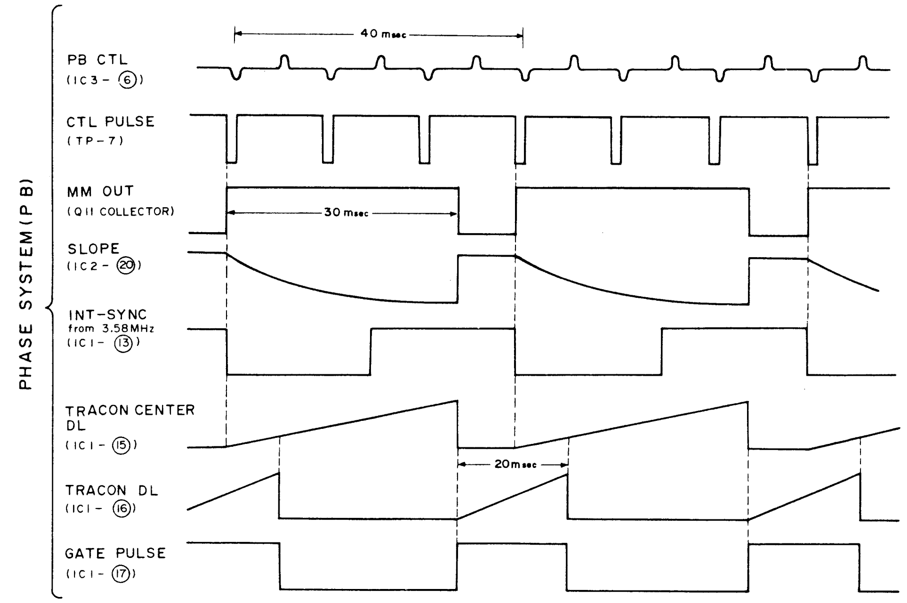

AS-3 BOARD
RF SW PULSE
R002
RV1 (PG-B DELAY)
C003
R003
RV2 (PG-A DELAY)
C004
R004
RV3 (LOCK PHASE)
C005
PG COIL
REC CTL
SLOPE
C035, R059
PG DET
FF
SW POSI DELAY-B
SW POSI DELAY-A
LOCK PHASE MULTI
GATE PULSE
HOLD
GATE
SINGLE SEP
SPEED MULTI
GATE PULSE
SLOPE
GATE
HOLD
Q001
BUFFER
GATE PULSE
TRACON MULTI
TRACON CENTER MULTI
YC-3 BOARD
RV25
Q011
RV10 (DRUM FREE SPEED)
R044
C026
STARTER
D005
VOLTAGE SHIFT
Q012
Q013
IC1
RV4 (TRACON CENTER)
Q032
Q002
DRUM ROTATION DET
Q003
TIME CONSTANT
Q035
Q034
BUFFER
LOW PASS
Q037
Q036
BUFFER
LOW PASS
Q033
Q008
Q006
BUFFER
Q007
SJ-1 BOARD
IC704
Q701
MMV
DRIVE PULSE GENELATE
IC707
GATE
IC703
IC705
IC703
IC705
IC706
PG SIG
SLOW SW
IC707
LOCK PHASE MULTI
IC707
MMV
IC701
GATE
HOLD
C710, R720
INTEGRATE
IC707
GATE PULSE
JD SIG
IC701
MMV
FRAME SW
IC703
BRAKE SIG GENELATE
CAPSTAN ROTATION DET
IC705
IC705
PAUSE 12V
PB 12V
CAPSTAN MOTOR CONT
EJECT 12V
REVERSE SIG
Ⓐ
Ⓑ
DRUM CONT SIG
IC2
GATE PULSE
STARTER
CAPSTAN MOTOR FG
FG AMP
HOLD
HOLD
GATE
SLOPE
SPEED MULTI (1)
SPEED MULTI (2)
SLOPE
GATE
IC3
M·M (1) / M·M (2)
Q004
Q005
RV8 (CAP FREE SPEED)
RV9
X3 (CAP FREE SPEED)
Q010
Q017
CAPSTAN MOTOR FG
Q050
BUFFER
Q031
Q047
CTL DET
Q046
Q045
CTL HEAD
Q030
Q021
Q023
M M
Q024
REC AMP
REC CTL
D015
D016
Q025
IC4
Q028
AMP
Q029
BUFFER
Q038
CTL DET (+)
IC5
F F
R159, C075
INTEGRATE
Q41
VOLTAGE COMPARE
Q42
IC5
Q022
R114
Q026
R116
Q039, Q040
CTL DET (−)
R161
R160
Q043
TIME CONSTANT (1)
TIME CONSTANT (2)
TIME CONSTANT
Q027
REC 12V
CAPSTAN FLY FG


AS-3 BOARD
RF SW PULSE
R002
RV1 (PG-B DELAY)
C003
R003
RV2 (PG-A DELAY)
C004
R004
RV3 (LOCK PHASE)
C005
REC CTL
SLOPE
C035, R059
PG DET
FF
SW POSI DELAY-B
SW POSI DELAY-A
LOCK PHASE MULTI
GATE PULSE
HOLD
GATE
SINGLE SEP
1/2 COUNT
M·M
SERVO REF SIG
Q001
BUFFER
TRACON MULTI
TRACON CENTER MULTI
X3 NOISE POSI
SPEED MULTI
GATE PULSE
SLOPE
GATE
HOLD
GATE PULSE
Q011
YC-3 BOARD
RV25
RV5
Q009
X3 SIG
RV10 (DRUM FREE SPEED)
R044
C026
STARTER
D005
VOLTAGE SHIFT
Q012
Q013
RV4 (TRACON CENTER)
IC1
Q032
PB + DUB 12V
FF 12V
REW 12V
PAUSE 12V
Q002
DRUM ROTATION DET
Q003
TIME CONSTANT
Q035
Q034
BUFFER
LOW PASS
Q037
Q036
BUFFER
LOW PASS
Q033
Q008
Q006
BUFFER
Q007
IC2
GATE PULSE
STARTER
FG AMP
HOLD
HOLD
GATE
SLOPE
SPEED MULTI (1)
SPEED MULTI (2)
SLOPE
GATE
CAPSTAN ERROR
DRUM ERROR
IC3
M·M (1) / M·M (2)
Q004
Q005
RV8 (CAP FREE SPEED)
RV9
X3 CAP FREE SPEED
Q010
Q017
MUTING SIG
Q050
BUFFER
DELAY
Q031
Q047
CTL DET
Q046
Q045
DELAY
THREADING
Q030
Q021 Q023
M M
Q024
REC AMP
REC CTL
D015 D016
Q025
IC4
R114
Q028
AMP
Q029
BUFFER
Q038
CTL DET (+)
IC5
F F
R159, C075
INTEGRATE
Q41
VOLTAGE COMPARE
Q42
IC5
R157, C074
INTEGRATE
IC5
WAVE SHAPE
INDEX SIG
Q022
TIME CONSTANT (1)
TIME CONSTANT (2)
TIME CONSTANT
R116
Q026
Q039, Q040
CTL DET (−)
R161
R160
Q043
Q044
DELAY
Q027
12V
STAN
FG
REVERSE SIG
LS-3 BOARD
Q507 − Q509
DRUM MOTOR DRIVE
Q510
BRAKE
V SERVO (DRUM MOTOR)
Q503, Q504
CAPSTAN MOTOR DRIVE
Q502
VOLTAGE COMPARE
V SERVO (CAPSTAN MOTOR)
Q505
Q506
BUFFER
REVERSE SIG (CAPSTAN MOTOR)
Q501
REVERSE SIG

## CUE/REVIEW BLOCK DIAGRAM

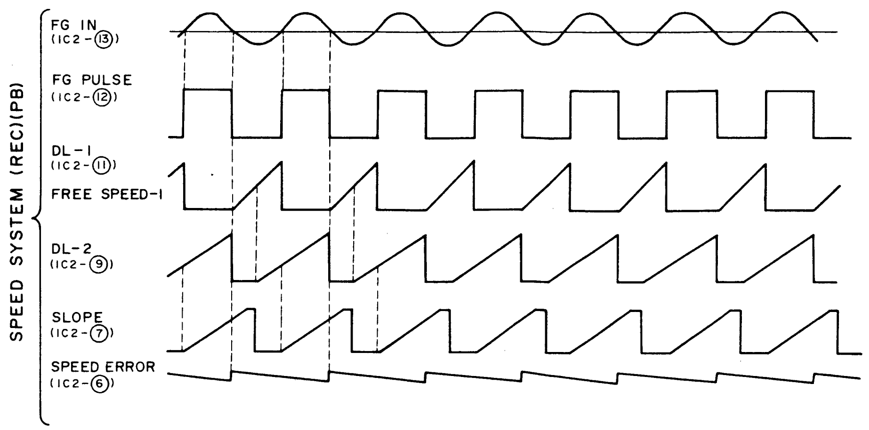

IC 4
IC 1
FF
FF
JD PULSE
MM
C20
BIFFERENTIAL
IC 2
IC 3
MULTI-PLIER
LPF
SCHMIDT
Q5
fH SIG
MM
LIMITER GATE
Q8,Q9
MM
RV3
Q10
MODE CONT SIG
Q6
FF
LV1 RV2
INTE-GRATER
D9
Q11, Q13
Q4
1H DELAY
THRES-HOLD
MM
CHROMA
IC 6
RV4
CHROMA
Q21
Q22,Q23,Q28
IC 5
REF. (4.43MHz)
45° SHIFT
RV6
C50,L10,C30
90° SHIFT
RV5
1/2 fH
BURST FLAG
CR-4 BOARD

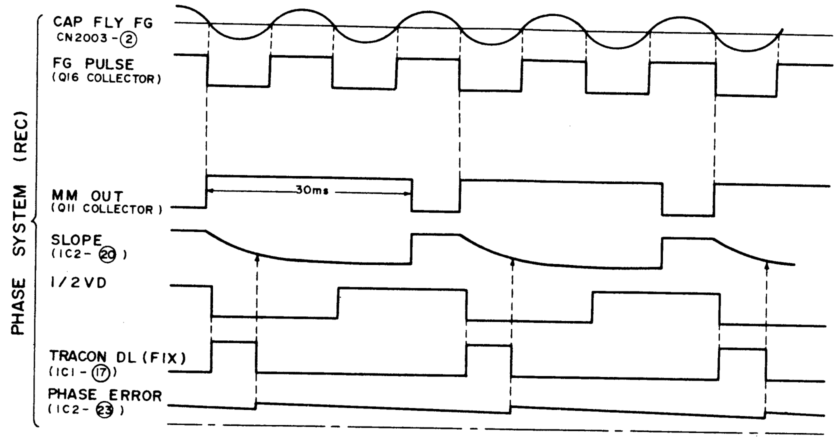
## CAPSTAN SERVO TIMING CHART (x3)

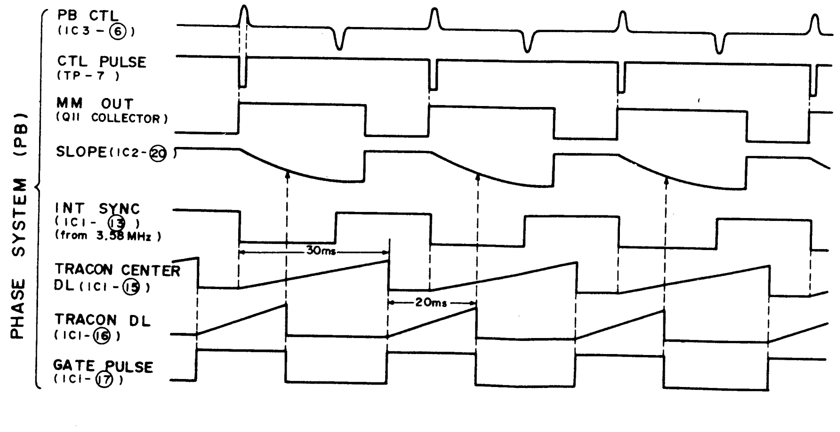

40 msec
PB CTL (IC3-⑥)
CTL PULSE (TP-7)
MM OUT (Q11 COLLECTOR)
30 msec
SLOPE (IC2-⑳)
INT-SYNC from 3.58MHz (IC1-⑬)
TRACON CENTER DL (IC1-⑮)
20 msec
TRACON DL (IC1-⑯)
GATE PULSE (IC1-⑰)
PHASE SYSTEM (PB)

## CAPSTAN SERVO TIMING CHART

## DRUM SE


SPEED SYSTEM (REC)(PB)
FG IN (IC2-⑬)
FG PULSE (IC2-⑫)
DL-1 (IC2-⑪)
FREE SPEED-1
DL-2 (IC2-⑨)
SLOPE (IC2-⑦)
SPEED ERROR (IC2-⑥)


PHASE SYSTEM (REC)
CAP FLY FG CN2003-②
FG PULSE (Q16 COLLECTOR)
MM OUT (Q11 COLLECTOR)
30ms
SLOPE (IC2-⑳)
1/2VD
TRACON DL (FIX) (IC1-⑰)
PHASE ERROR (IC2-㉓)

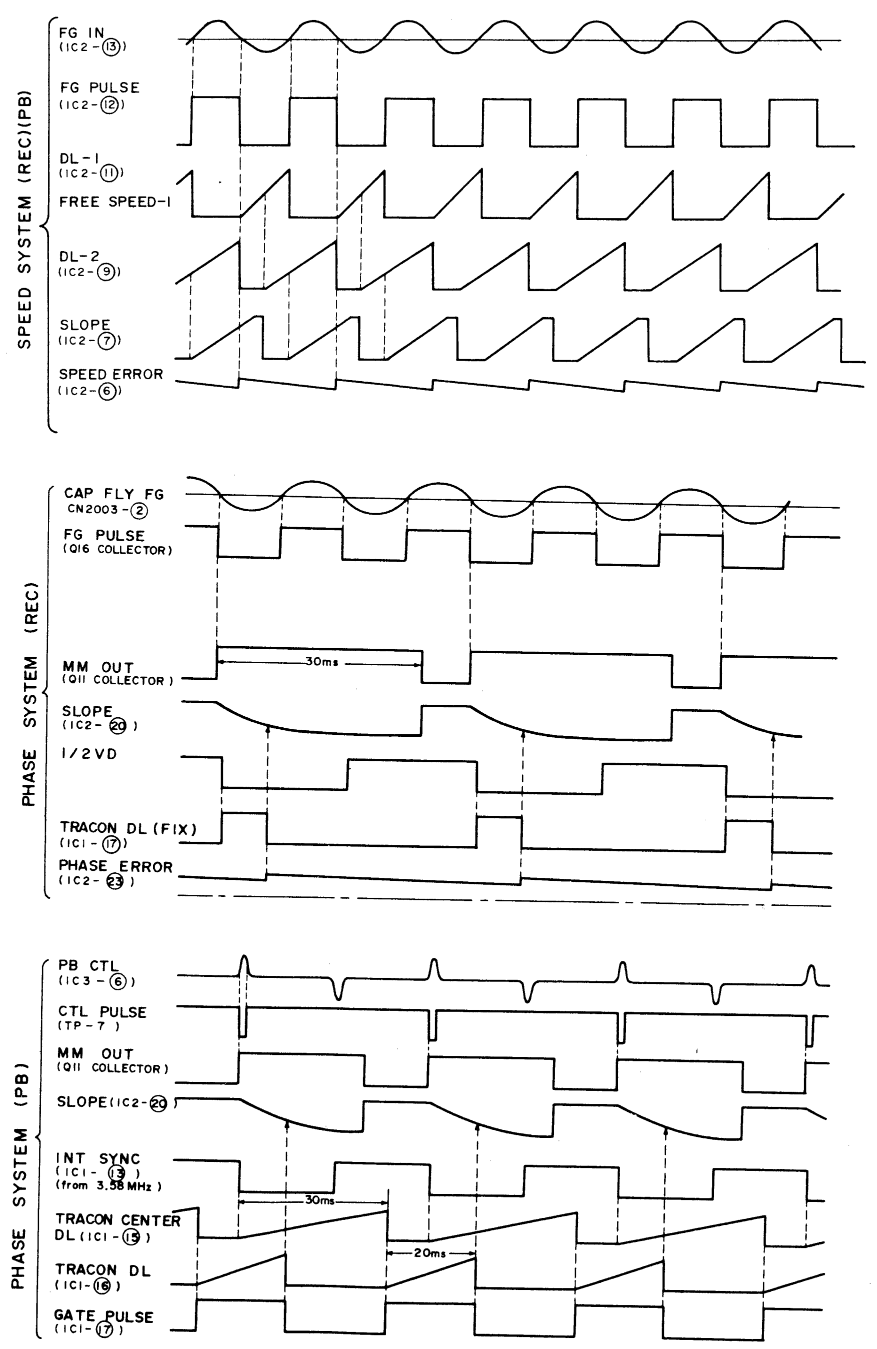

PHASE SYSTEM (PB)
PB CTL (IC3-⑥)
CTL PULSE (TP-7)
MM OUT (Q11 COLLECTOR)
SLOPE (IC2-⑳)
INT SYNC (IC1-⑬) (from 3.58MHz)
30ms
TRACON CENTER DL (IC1-⑮)
20ms
TRACON DL (IC1-⑯)
GATE PULSE (IC1-⑰)

SPEED SYSTEM(REC)(PB)
PHASE SYSTEM (REC)
PHASE SYSTEM(PB)

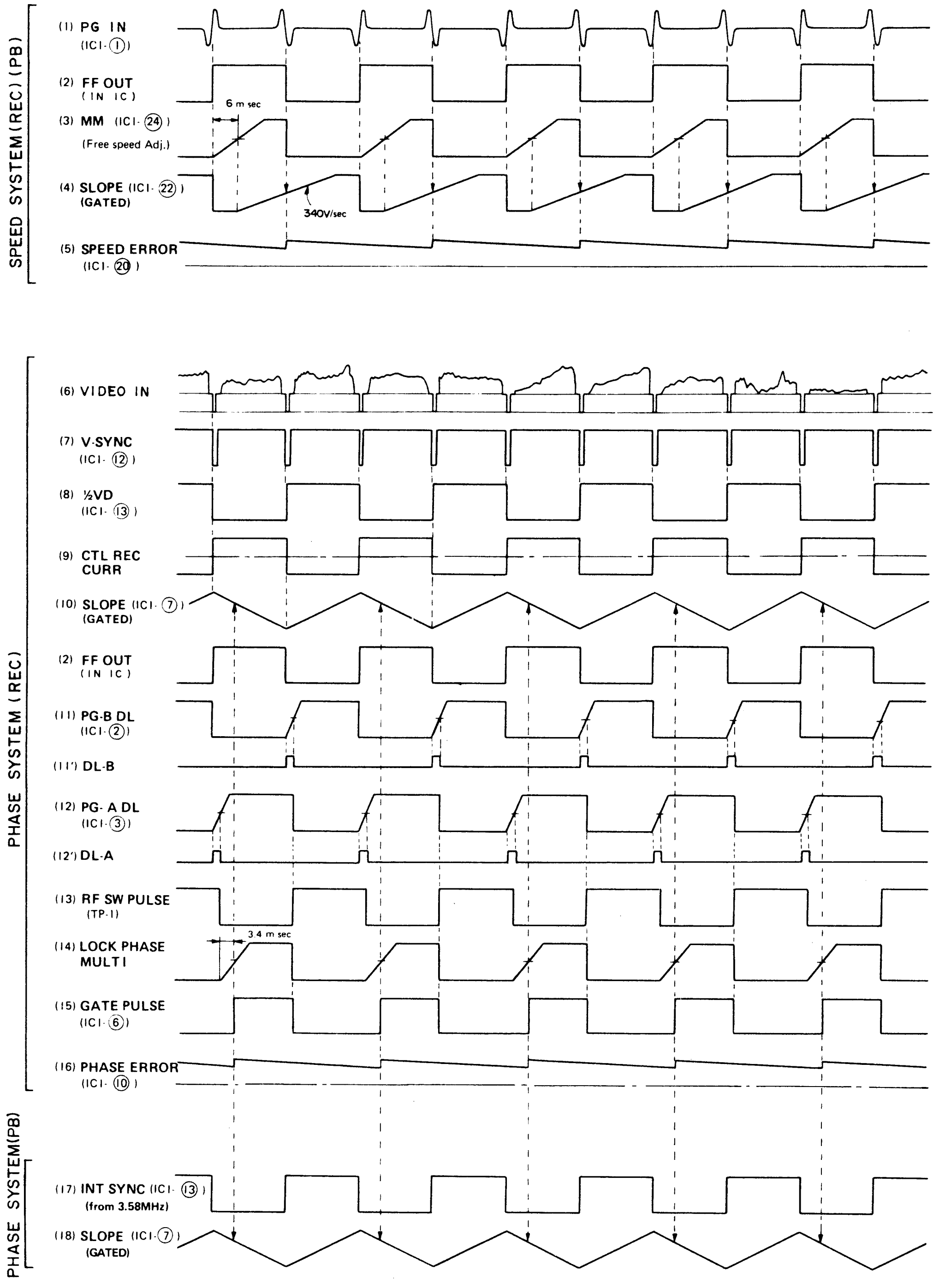
## CAPSTAN SERVO TIMING CHART

JD PULSE

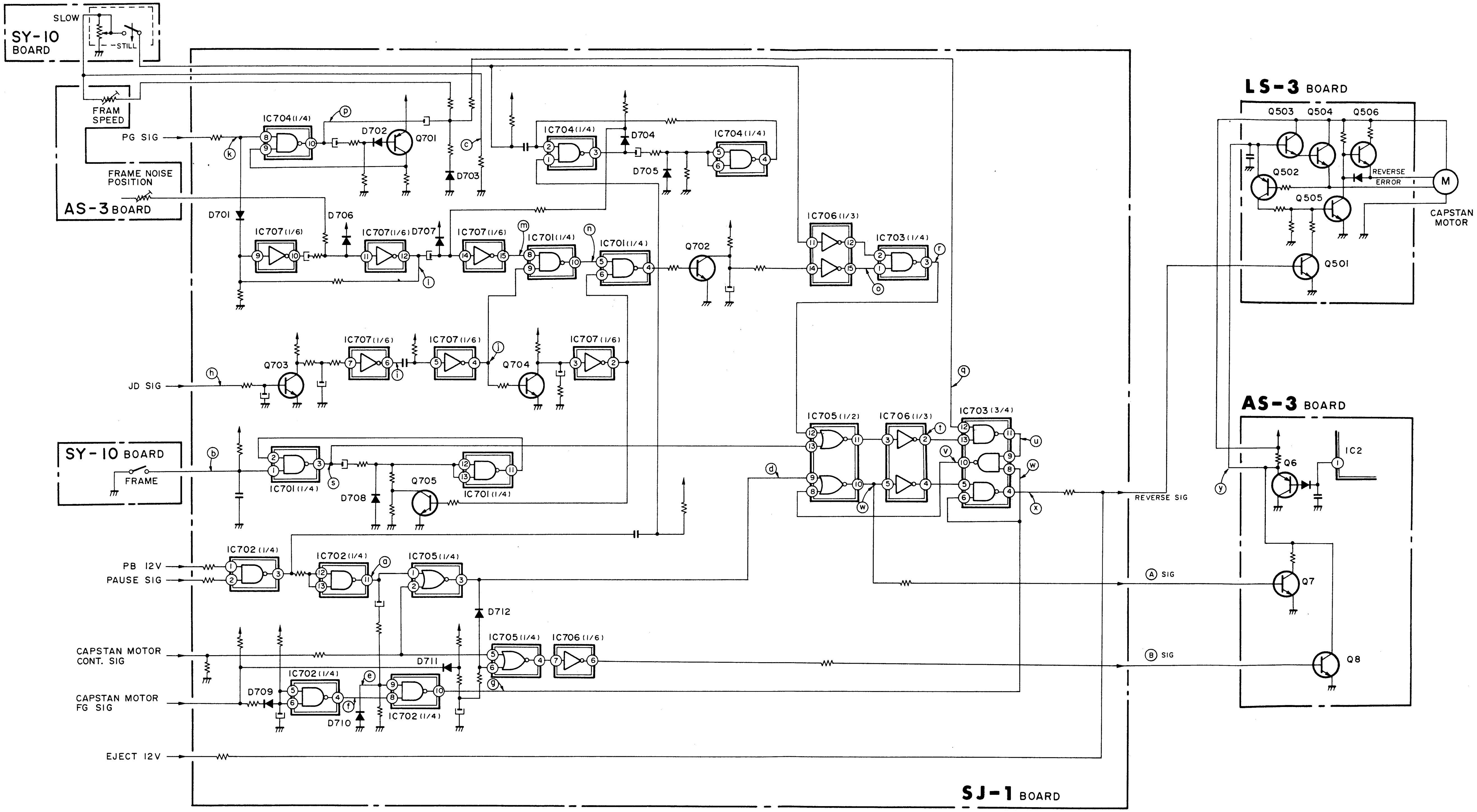
CHROMA


SPEED SYSTEM (REC)(PB)
FG IN (IC2-⑬)
FG PULSE (IC2-⑫)
DL-1 (IC2-⑪)
FREE SPEED-1
DL-2 (IC2-⑨)
SLOPE (IC2-⑦)
SPEED ERROR (IC2-⑥)
PHASE SYSTEM (REC)
CAP FLY FG CN2003-②
FG PULSE (Q16 COLLECTOR)
MM OUT (Q11 COLLECTOR)
30ms
SLOPE (IC2-⑳)
1/2VD
TRACON DL (FIX) (IC1-⑰)
PHASE ERROR (IC2-㉓)
PHASE SYSTEM (PB)
PB CTL (IC3-⑥)
CTL PULSE (TP-7)
MM OUT (Q11 COLLECTOR)
SLOPE (IC2-⑳)
INT SYNC (IC1-⑬) (from 3.58MHz)
30ms
TRACON CENTER DL (IC1-⑮)
20ms
TRACON DL (IC1-⑯)
GATE PULSE (IC1-⑰)

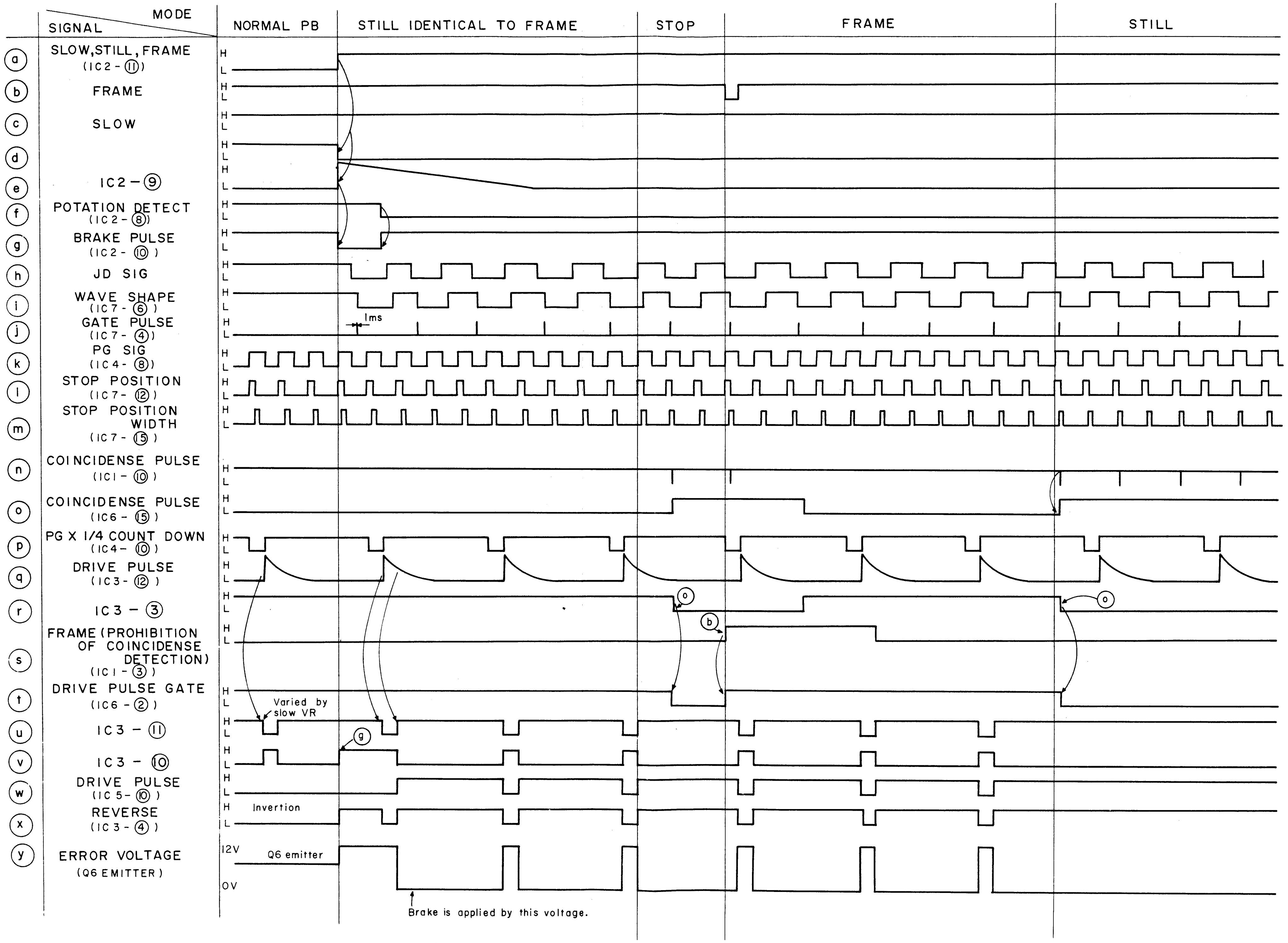
## DRUM SERVO TIMING CHART


SPEED SYSTEM (REC) (PB)
(1) PG IN (IC1-①)
(2) FF OUT (IN IC)
6 m sec
(3) MM (IC1-㉔) (Free speed Adj.)
(4) SLOPE (IC1-㉒) (GATED)
340V/sec
(5) SPEED ERROR (IC1-⑳)
PHASE SYSTEM (REC)
(6) VIDEO IN
(7) V-SYNC (IC1-⑫)
(8) ½VD (IC1-⑬)
(9) CTL REC CURR
(10) SLOPE (IC1-⑦) (GATED)
(2) FF OUT (IN IC)
(11) PG-B DL (IC1-②)
(11') DL-B
(12) PG-A DL (IC1-③)
(12') DL-A
(13) RF SW PULSE (TP-1)
3.4 m sec
(14) LOCK PHASE MULTI
(15) GATE PULSE (IC1-⑥)
(16) PHASE ERROR (IC1-⑩)
PHASE SYSTEM(PB)
(17) INT SYNC (IC1-⑬) (from 3.58MHz)
(18) SLOPE (IC1-⑦) (GATED)

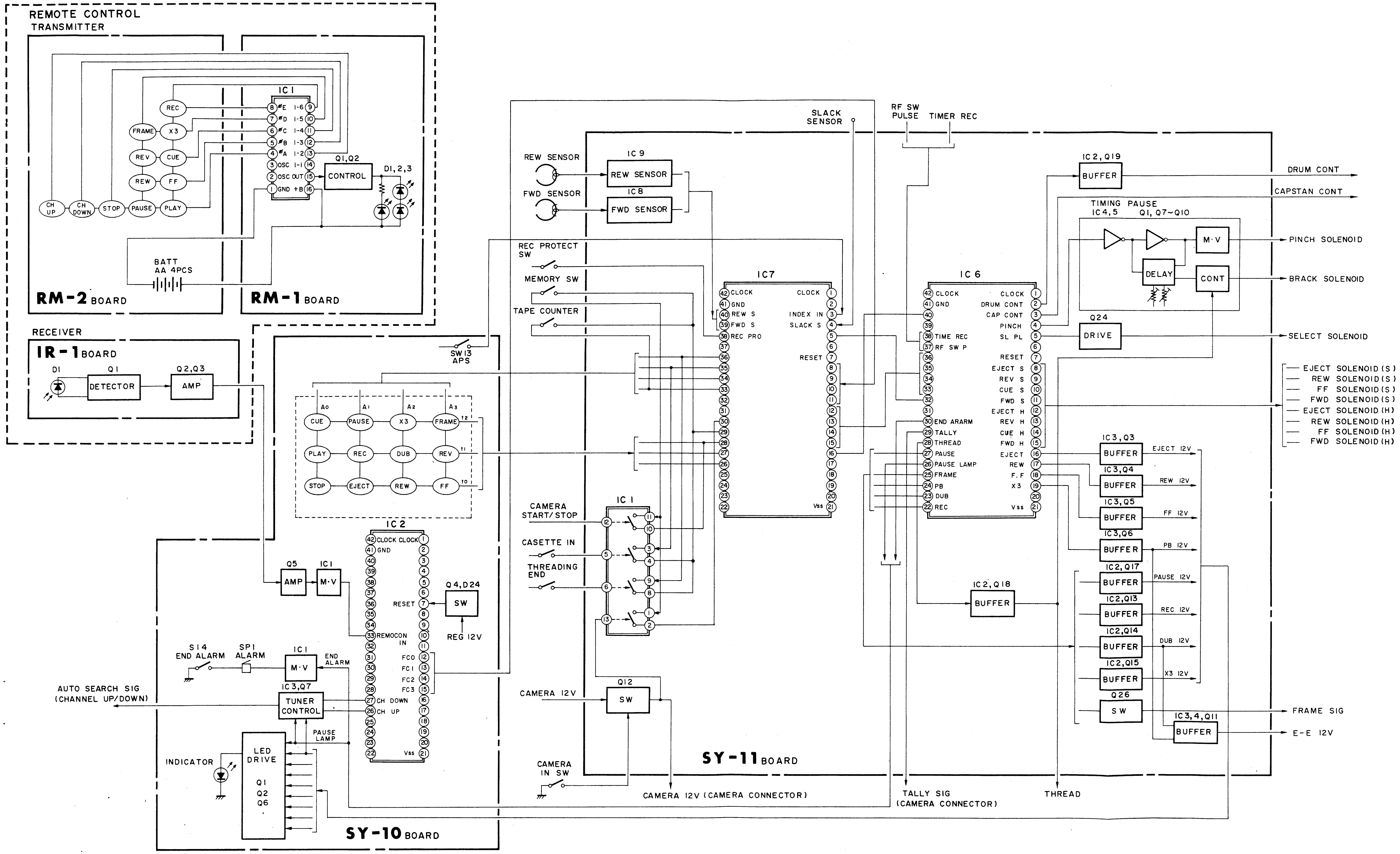
## CAPSTAN DRIVE BLOCK DIAGRAM


SY-10 BOARD
SLOW
STILL
FRAM SPEED
PG SIG
FRAME NOISE POSITION
AS-3 BOARD
IC704 (1/4)
D702
Q701
D703
D701
D706
IC707 (1/6)
D707
IC701 (1/4)
D704
D705
Q702
IC706 (1/3)
IC703 (1/4)
JD SIG
Q703
Q704
SY-10 BOARD
FRAME
D708
Q705
IC705 (1/2)
IC703 (3/4)
PB 12V
PAUSE SIG
IC702 (1/4)
IC705 (1/4)
D712
CAPSTAN MOTOR CONT. SIG
CAPSTAN MOTOR FG SIG
D709
D710
D711
IC706 (1/6)
EJECT 12V
SJ-1 BOARD
REVERSE SIG
Ⓐ SIG
Ⓑ SIG
LS-3 BOARD
Q503
Q504
Q506
Q502
Q505
Q501
REVERSE ERROR
M
CAPSTAN MOTOR
AS-3 BOARD
Q6
IC2
Q7
Q8
ⓐ
ⓑ
ⓒ
ⓓ
ⓔ
ⓕ
ⓖ
ⓗ
ⓘ
ⓙ
ⓚ
ⓛ
ⓜ
ⓝ
ⓞ
ⓟ
ⓠ
ⓡ
ⓢ
ⓣ
ⓤ
ⓥ
ⓦ
ⓧ
ⓨ

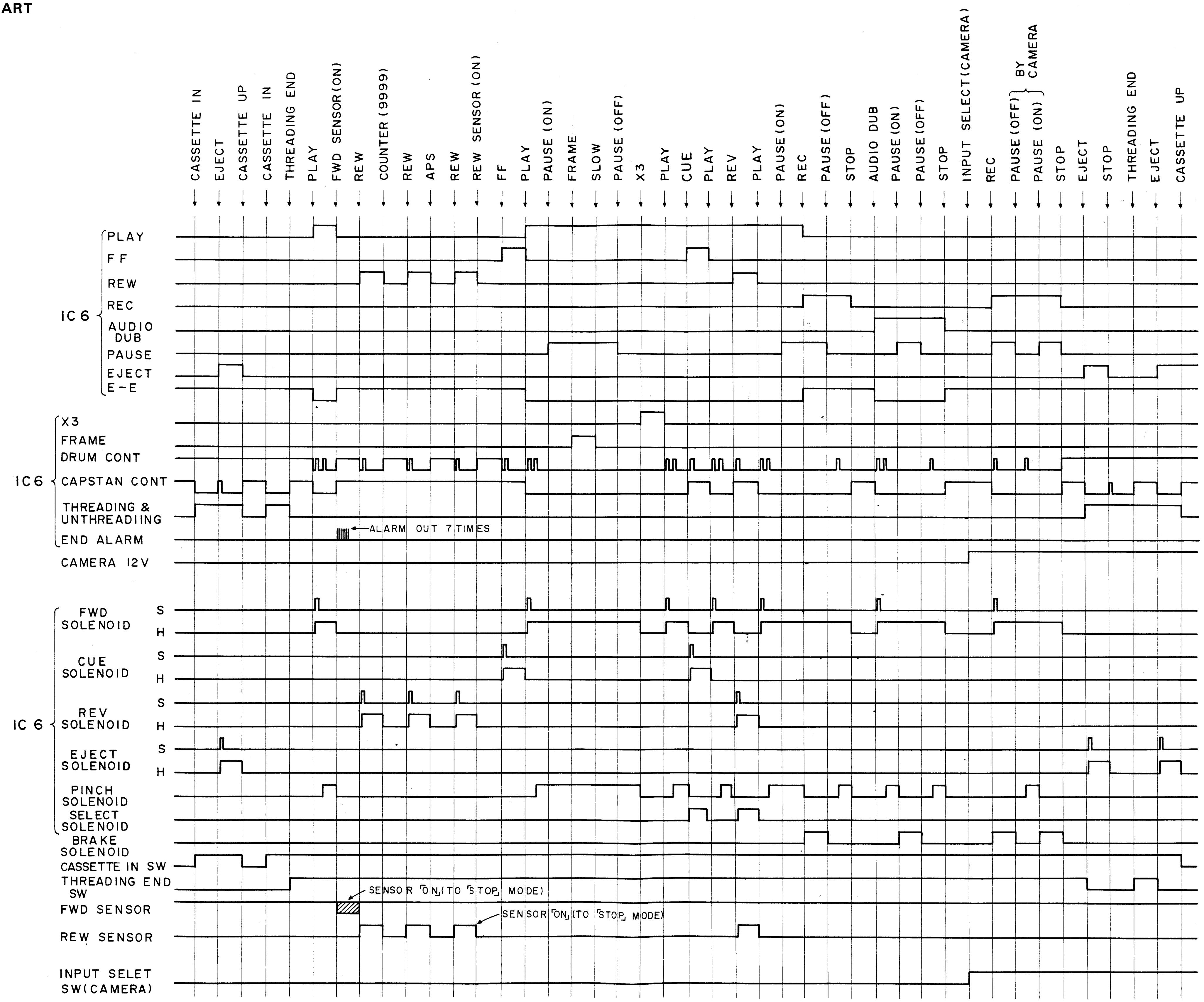
## CAPSTAN DRIVE TIMING CHART


MODE
SIGNAL
NORMAL PB
STILL IDENTICAL TO FRAME
STOP
FRAME
STILL
ⓐ SLOW,STILL,FRAME (IC2-⑪)
ⓑ FRAME
ⓒ SLOW
ⓓ
ⓔ IC2-⑨
ⓕ POTATION DETECT (IC2-⑧)
ⓖ BRAKE PULSE (IC2-⑩)
ⓗ JD SIG
ⓘ WAVE SHAPE (IC7-⑥)
ⓙ GATE PULSE (IC7-④)
ⓚ PG SIG (IC4-⑧)
ⓛ STOP POSITION (IC7-⑫)
ⓜ STOP POSITION WIDTH (IC7-⑮)
ⓝ COINCIDENSE PULSE (IC1-⑩)
ⓞ COINCIDENSE PULSE (IC6-⑮)
ⓟ PG X 1/4 COUNT DOWN (IC4-⑩)
ⓠ DRIVE PULSE (IC3-⑫)
ⓡ IC3-③
ⓢ FRAME (PROHIBITION OF COINCIDENSE DETECTION) (IC1-③)
ⓣ DRIVE PULSE GATE (IC6-②)
ⓤ IC3-⑪
ⓥ IC3-⑩
ⓦ DRIVE PULSE (IC5-⑩)
ⓧ REVERSE (IC3-④)
ⓨ ERROR VOLTAGE (Q6 EMITTER)
H
L
1ms
Varied by slow VR
Invertion
12V
0V
Q6 emitter
Brake is applied by this voltage.
ⓞ
ⓑ
ⓖ

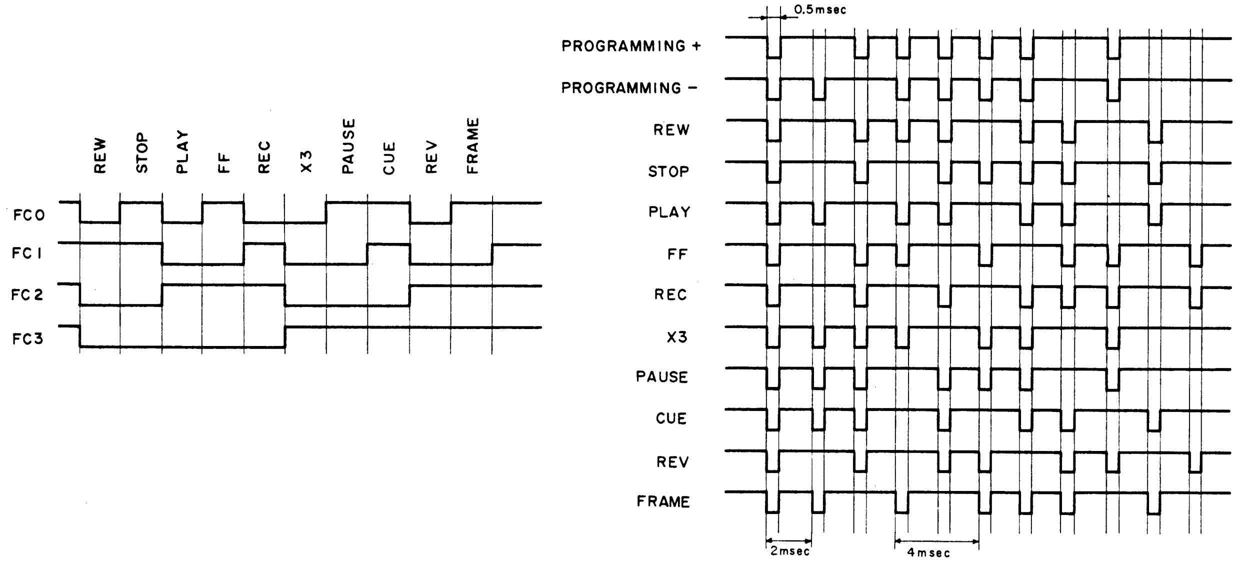
## SYSTEM CONTROL BLOCK DIAGRAM


REMOTE CONTROL
TRANSMITTER
IC1
REC
FRAME
X3
REV
CUE
REW
FF
CH UP
CH DOWN
STOP
PAUSE
PLAY
E 1-6
D 1-5
C 1-4
B 1-3
A 1-2
OSC 1-1
OSC OUT
GND +B
Q1,Q2
CONTROL
D1,2,3
BATT
AA 4PCS
RM-2 BOARD
RM-1 BOARD
RECEIVER
IR-1 BOARD
D1
Q1
DETECTOR
Q2,Q3
AMP
SW13
APS
A0
A1
A2
A3
CUE
PAUSE
X3
FRAME
PLAY
REC
DUB
REV
STOP
EJECT
REW
FF
t2
t1
t0
IC2
CLOCK CLOCK
GND
RESET
REMOCON IN
FC0
FC1
FC2
FC3
CH DOWN
CH UP
Vss
Q5
AMP
IC1
M·V
Q4,D24
SW
REG 12V
S14
END ALARM
SP1
ALARM
IC1
M·V
END ALARM
IC3,Q7
TUNER CONTROL
AUTO SEARCH SIG
(CHANNEL UP/DOWN)
PAUSE LAMP
INDICATOR
LED DRIVE
Q1
Q2
Q6
SY-10 BOARD
REW SENSOR
FWD SENSOR
IC9
REW SENSOR
IC8
FWD SENSOR
REC PROTECT SW
MEMORY SW
TAPE COUNTER
SLACK SENSOR
IC7
CLOCK
GND
REW S
FWD S
REC PRO
CLOCK
INDEX IN
SLACK S
RESET
Vss
CAMERA START/STOP
CASETTE IN
THREADING END
IC1
CAMERA 12V
Q12
SW
CAMERA IN SW
CAMERA 12V (CAMERA CONNECTOR)
SY-11 BOARD
RF SW PULSE
TIMER REC
IC6
CLOCK
GND
TIME REC
RF SW P
END ARARM
TALLY
THREAD
PAUSE
PAUSE LAMP
FRAME
PB
DUB
REC
CLOCK
DRUM CONT
CAP CONT
PINCH
SL PL
RESET
EJECT S
REV S
CUE S
FWD S
EJECT H
REV H
CUE H
FWD H
EJECT
REW
F.F
X3
Vss
IC2,Q19
BUFFER
DRUM CONT
CAPSTAN CONT
TIMING PAUSE
IC4,5
Q1, Q7~Q10
M·V
DELAY
CONT
PINCH SOLENOID
BRACK SOLENOID
Q24
DRIVE
SELECT SOLENOID
EJECT SOLENOID (S)
REW SOLENOID (S)
FF SOLENOID (S)
FWD SOLENOID (S)
EJECT SOLENOID (H)
REW SOLENOID (H)
FF SOLENOID (H)
FWD SOLENOID (H)
IC3,Q3
BUFFER
EJECT 12V
IC3,Q4
BUFFER
REW 12V
IC3,Q5
BUFFER
FF 12V
IC3,Q6
BUFFER
PB 12V
IC2,Q17
BUFFER
PAUSE 12V
IC2,Q13
BUFFER
REC 12V
IC2,Q14
BUFFER
DUB 12V
IC2,Q15
BUFFER
X3 12V
Q26
SW
FRAME SIG
IC3,4,Q11
BUFFER
E-E 12V
IC2,Q18
BUFFER
TALLY SIG
(CAMERA CONNECTOR)
THREAD

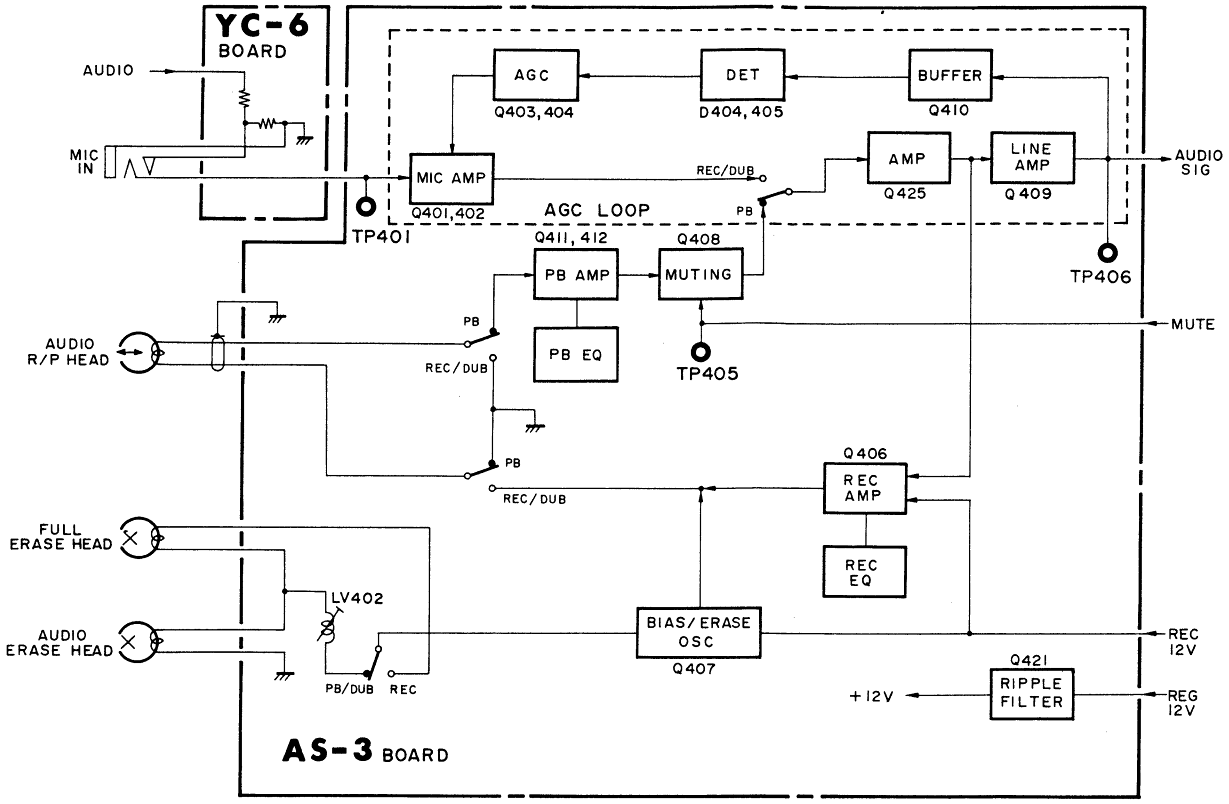
## SYSTEM CONTROL TIMING CHART


CASSETTE IN
EJECT
CASSETTE UP
CASSETTE IN
THREADING END
PLAY
FWD SENSOR (ON)
REW
COUNTER (9999)
REW
APS
REW
REW SENSOR (ON)
FF
PLAY
PAUSE (ON)
FRAME
SLOW
PAUSE (OFF)
X3
PLAY
CUE
PLAY
REV
PLAY
PAUSE (ON)
REC
PAUSE (OFF)
STOP
AUDIO DUB
PAUSE (ON)
PAUSE (OFF)
STOP
INPUT SELECT (CAMERA)
REC
PAUSE (OFF)
PAUSE (ON)
BY CAMERA
STOP
EJECT
STOP
THREADING END
EJECT
CASSETTE UP
IC 6
PLAY
FF
REW
REC
AUDIO DUB
PAUSE
EJECT
E-E
IC6
X3
FRAME
DRUM CONT
CAPSTAN CONT
THREADING & UNTHREADIING
END ALARM
ALARM OUT 7 TIMES
CAMERA 12V
IC 6
FWD SOLENOID
S
H
CUE SOLENOID
S
H
REV SOLENOID
S
H
EJECT SOLENOID
S
H
PINCH SOLENOID
SELECT SOLENOID
BRAKE SOLENOID
CASSETTE IN SW
THREADING END SW
SENSOR "ON" (TO "STOP" MODE)
FWD SENSOR
SENSOR "ON" (TO "STOP" MODE)
REW SENSOR
INPUT SELET SW(CAMERA)

## REMOTE CONTROL TIMING CHART

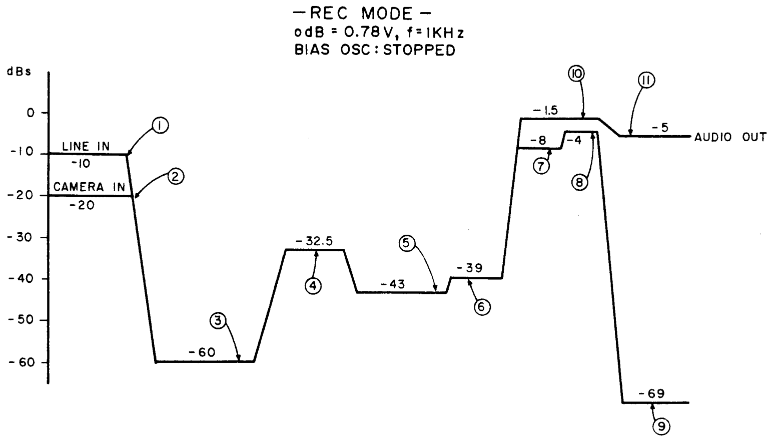


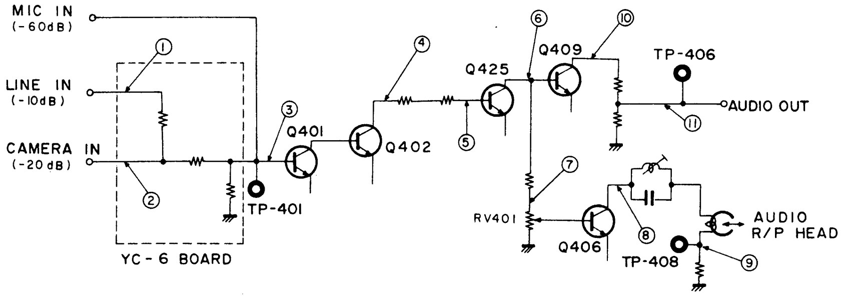
## AUDIO BLOCK DIAGRAM


YC-6 BOARD
AUDIO
MIC IN
TP401
AGC
Q403,404
DET
D404,405
BUFFER
Q410
MIC AMP
Q401,402
AGC LOOP
REC/DUB
PB
AMP
Q425
LINE AMP
Q409
AUDIO SIG
TP406
Q411,412
PB AMP
PB EQ
Q408
MUTING
TP405
MUTE
AUDIO R/P HEAD
PB
REC/DUB
PB
REC/DUB
Q406
REC AMP
REC EQ
FULL ERASE HEAD
AUDIO ERASE HEAD
LV402
PB/DUB
REC
BIAS/ERASE OSC
Q407
REC 12V
Q421
RIPPLE FILTER
+12V
REG 12V
AS-3 BOARD

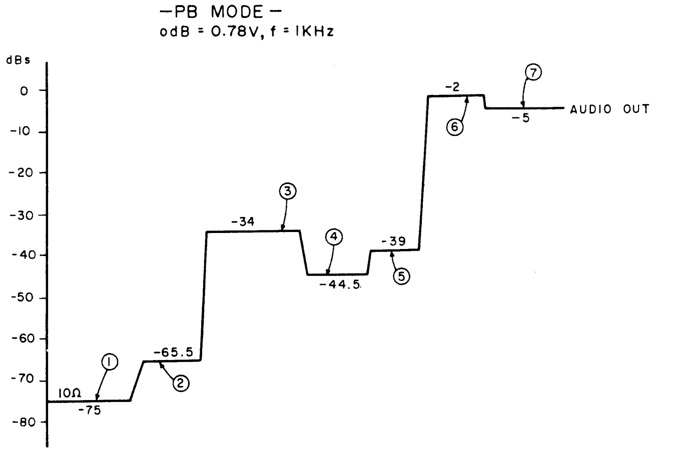
## AUDIO LEVEL DIAGRAM

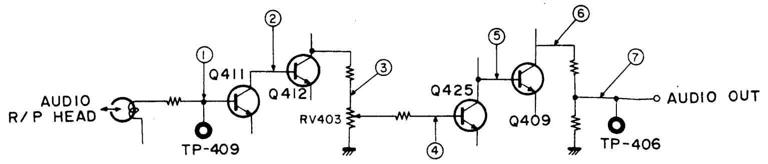
### – REC MODE –



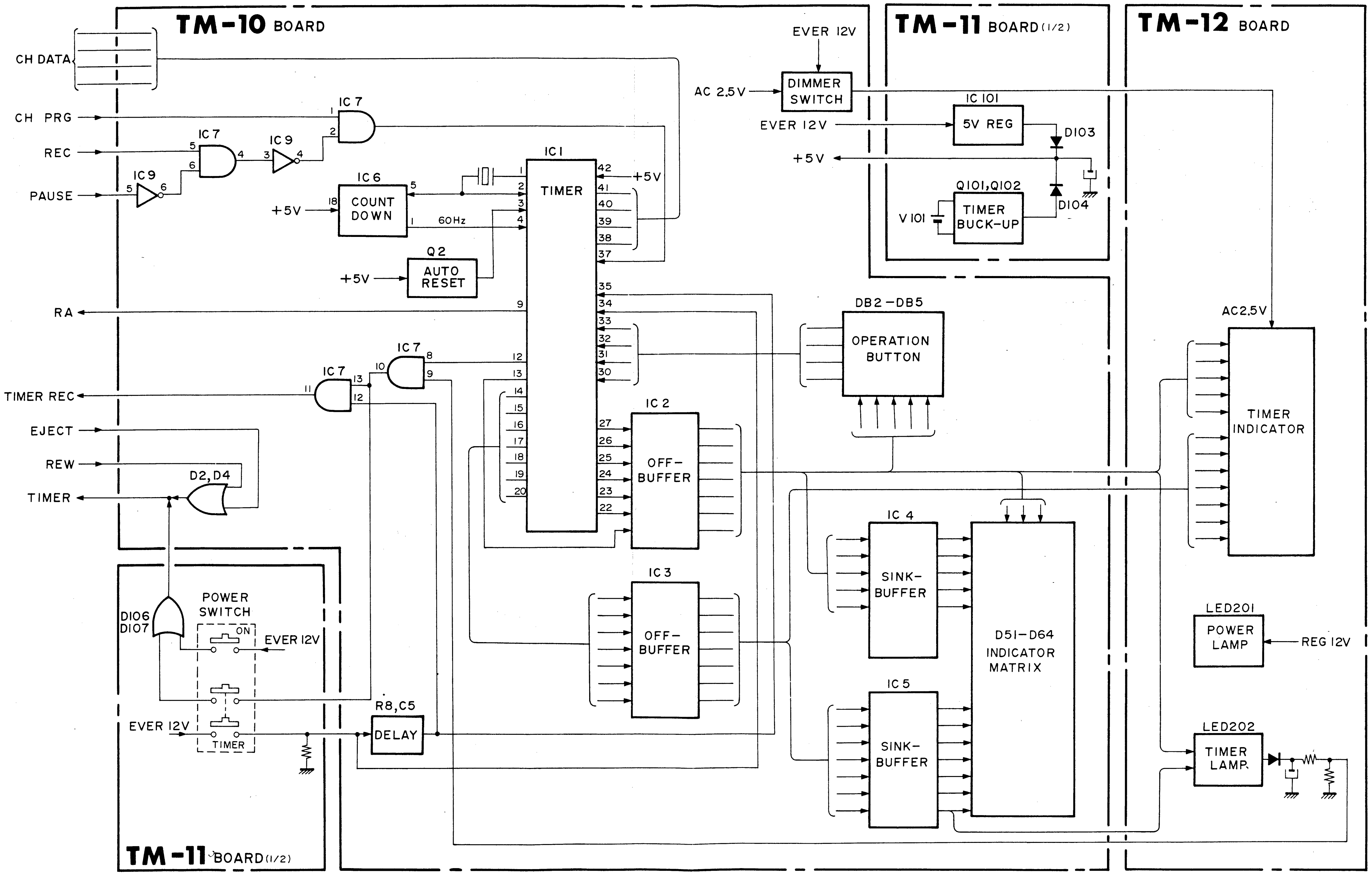

MIC IN
(-60dB)
LINE IN
(-10dB)
CAMERA IN
(-20dB)
①
②
③
TP-401
Q401
Q402
④
⑤
Q425
⑥
Q409
⑩
TP-406
AUDIO OUT
⑪
⑦
RV401
Q406
⑧
TP-408
AUDIO R/P HEAD
⑨
YC-6 BOARD

### – PB MODE –

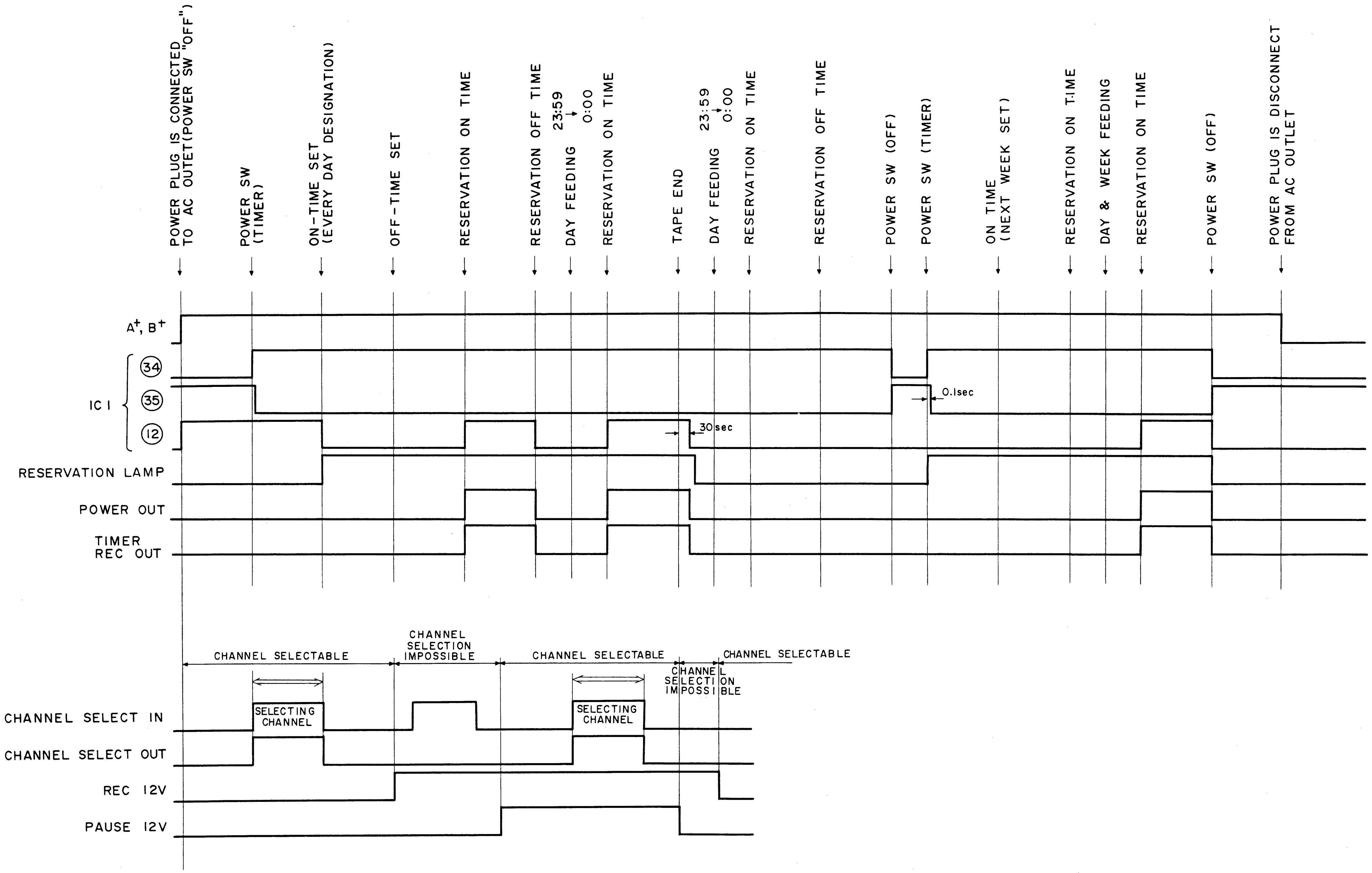



AUDIO R/P HEAD
①
Q411
TP-409
②
Q412
③
RV403
④
⑤
Q425
Q409
⑥
⑦
TP-406
AUDIO OUT

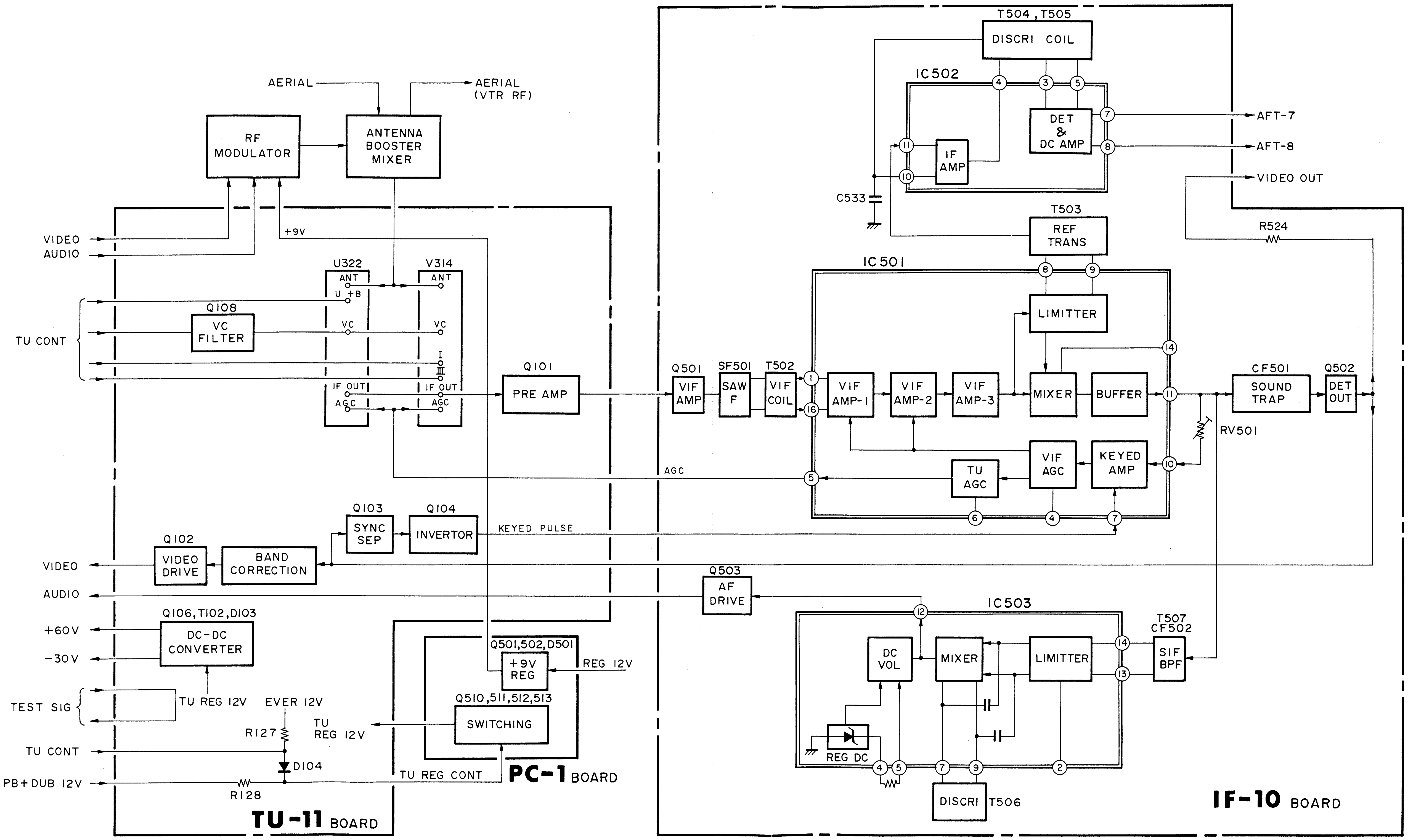
## TIMER BLOCK DIAGRAM


TM-10 BOARD
TM-11 BOARD (1/2)
TM-12 BOARD
CH DATA
CH PRG
REC
PAUSE
RA
TIMER REC
EJECT
REW
TIMER
IC 7
IC 9
IC 6
COUNT DOWN
+5V
60Hz
Q 2
AUTO RESET
IC 1
TIMER
EVER 12V
AC 2.5V
DIMMER SWITCH
IC 101
5V REG
D103
D104
Q101,Q102
TIMER BUCK-UP
V 101
DB2 – DB5
OPERATION BUTTON
IC 2
OFF-BUFFER
IC 3
IC 4
SINK-BUFFER
IC 5
D51 – D64
INDICATOR MATRIX
AC2.5V
TIMER INDICATOR
LED201
POWER LAMP
REG 12V
LED202
TIMER LAMP
D2, D4
D106
D107
POWER SWITCH
ON
R8, C5
DELAY

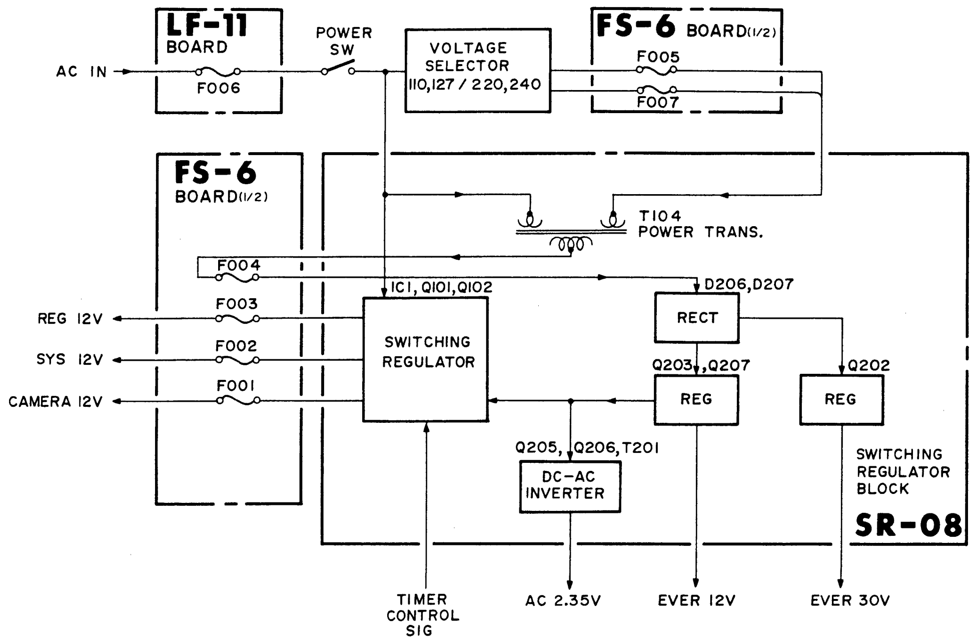
## TIMER TIMING CHART


POWER PLUG IS CONNECTED TO AC OUTET(POWER SW "OFF")
POWER SW (TIMER)
ON-TIME SET (EVERY DAY DESIGNATION)
OFF-TIME SET
RESERVATION ON TIME
RESERVATION OFF TIME
DAY FEEDING 23:59 → 0:00
RESERVATION ON TIME
TAPE END
DAY FEEDING 23:59 → 0:00
RESERVATION ON TIME
RESERVATION OFF TIME
POWER SW (OFF)
POWER SW (TIMER)
ON TIME (NEXT WEEK SET)
RESERVATION ON TIME
DAY & WEEK FEEDING
RESERVATION ON TIME
POWER SW (OFF)
POWER PLUG IS DISCONNECT FROM AC OUTLET
A+, B+
IC I
34
35
12
0.1sec
30sec
RESERVATION LAMP
POWER OUT
TIMER REC OUT
CHANNEL SELECTABLE
CHANNEL SELECTION IMPOSSIBLE
CHANNEL SELECTABLE
CHANNEL SELECTION IMPOSSIBLE
CHANNEL SELECTABLE
SELECTING CHANNEL
SELECTING CHANNEL
CHANNEL SELECT IN
CHANNEL SELECT OUT
REC 12V
PAUSE 12V

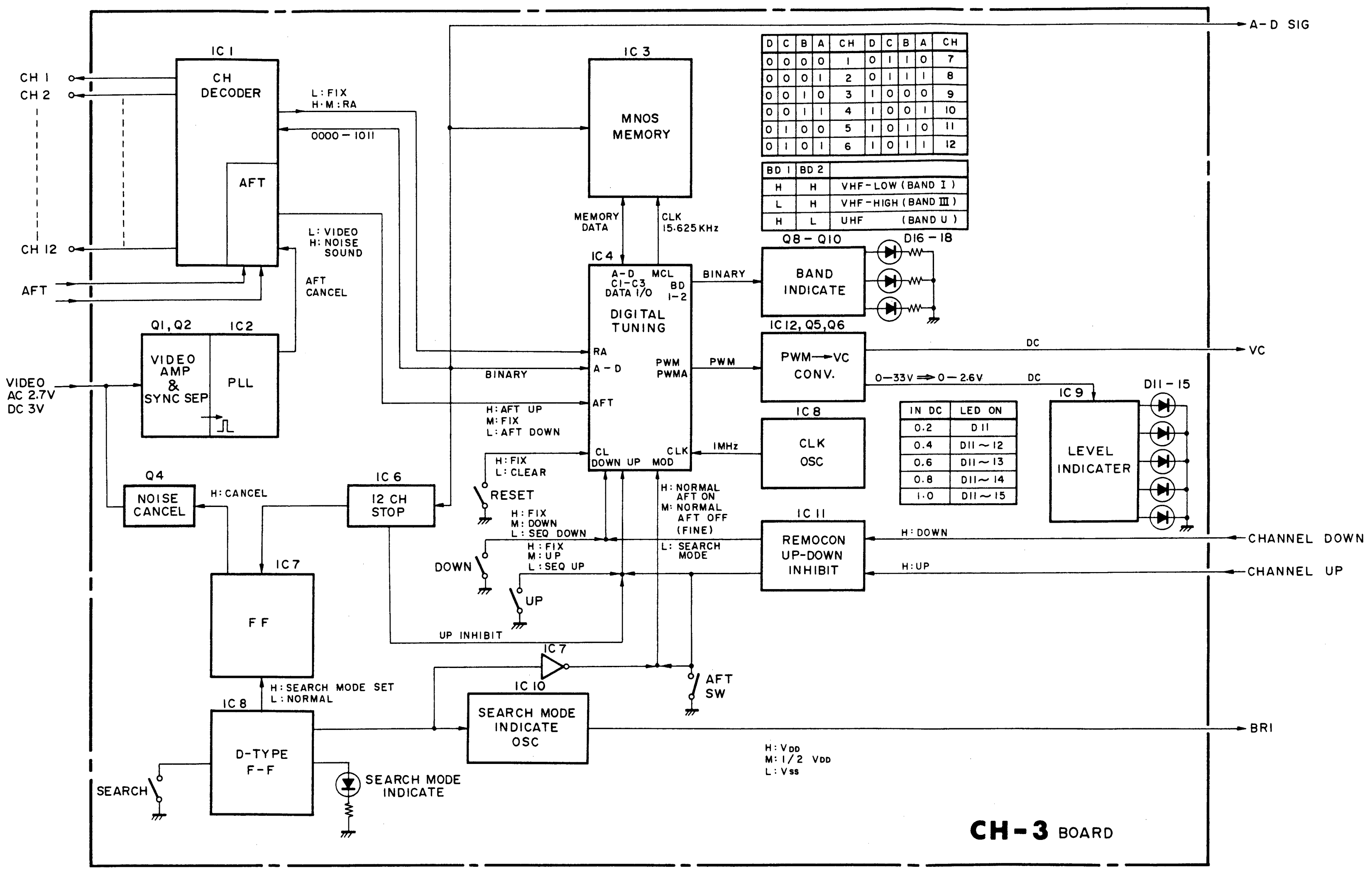
## TUNER-IF BLOCK DIAGRAM


AERIAL
AERIAL (VTR RF)
RF MODULATOR
ANTENNA BOOSTER MIXER
VIDEO
AUDIO
+9V
U322
ANT
U +B
VC
V314
ANT
VC
I
III
IF OUT
AGC
IF OUT
AGC
TU CONT
Q108
VC FILTER
Q101
PRE AMP
Q103
SYNC SEP
Q104
INVERTOR
KEYED PULSE
Q102
VIDEO DRIVE
BAND CORRECTION
VIDEO
AUDIO
Q106,T102,D103
DC-DC CONVERTER
+60V
-30V
TEST SIG
TU REG 12V
EVER 12V
R127
TU REG 12V
D104
TU CONT
PB+DUB 12V
R128
TU REG CONT
Q501,502,D501
+9V REG
REG 12V
Q510,511,512,513
SWITCHING
PC-1 BOARD
TU-11 BOARD
T504, T505
DISCRI COIL
IC502
DET & DC AMP
IF AMP
AFT-7
AFT-8
VIDEO OUT
C533
T503
REF TRANS
R524
IC501
LIMITTER
Q501
VIF AMP
SF501
SAW F
T502
VIF COIL
VIF AMP-1
VIF AMP-2
VIF AMP-3
MIXER
BUFFER
CF501
SOUND TRAP
Q502
DET OUT
RV501
VIF AGC
KEYED AMP
TU AGC
AGC
Q503
AF DRIVE
IC503
T507
CF502
SIF BPF
DC VOL
MIXER
LIMITTER
REG DC
DISCRI
T506
IF-10 BOARD

## POWER SUPPLY BLOCK DIAGRAM


LF-11 BOARD
AC IN
F006
POWER SW
VOLTAGE SELECTOR 110,127 / 220,240
FS-6 BOARD(1/2)
F005
F007
FS-6 BOARD(1/2)
T104 POWER TRANS.
F004
IC1, Q101, Q102
D206, D207
F003
REG 12V
SWITCHING REGULATOR
RECT
F002
SYS 12V
Q203, Q207
Q202
F001
CAMERA 12V
REG
REG
Q205, Q206, T201
DC-AC INVERTER
SWITCHING REGULATOR BLOCK
SR-08
TIMER CONTROL SIG
AC 2.35V
EVER 12V
EVER 30V

## AUTO PROGRAME SEARCH BLOCK DIAGRAM

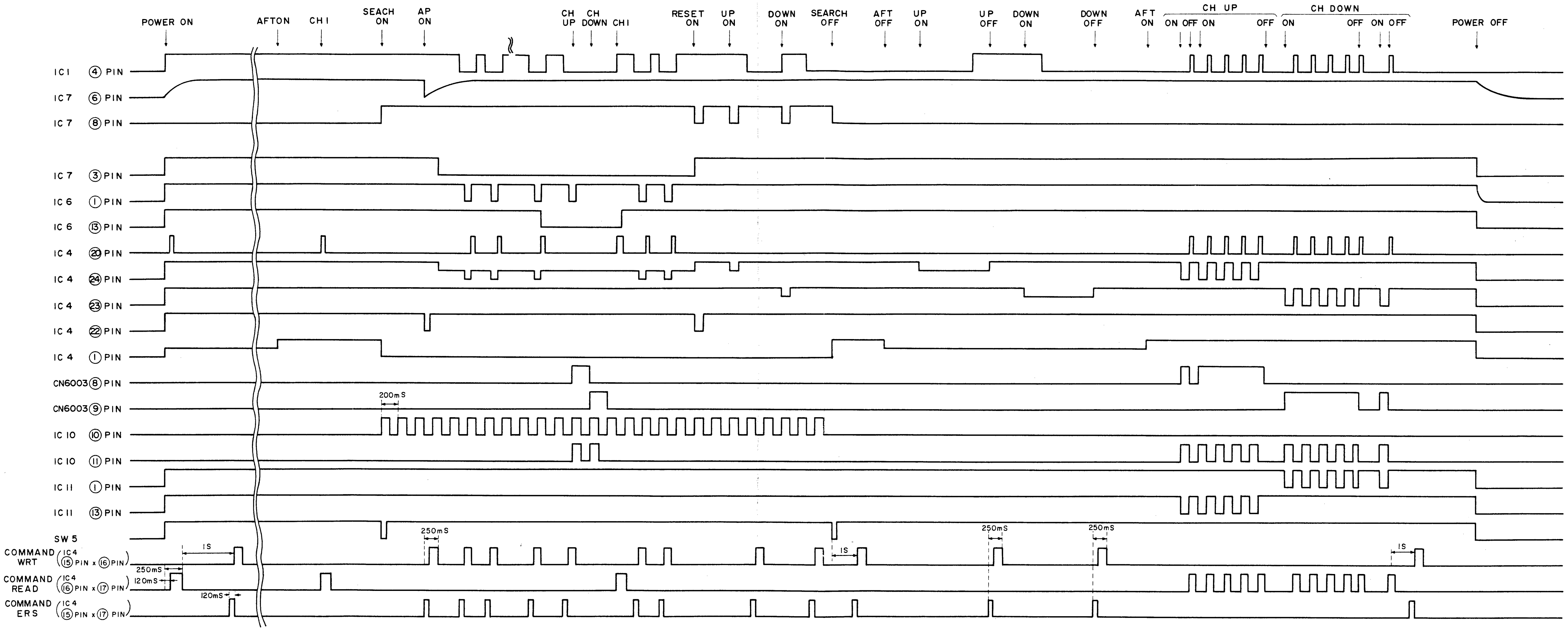

IC1
CH DECODER
AFT
CH 1
CH 2
CH 12
AFT
L: FIX
H·M: RA
0000 – 1011
L: VIDEO
H: NOISE SOUND
AFT CANCEL
Q1, Q2
IC2
VIDEO AMP & SYNC SEP
PLL
VIDEO AC 2.7V DC 3V
Q4
NOISE CANCEL
H: CANCEL
IC6
12 CH STOP
IC7
FF
H: SEARCH MODE SET
L: NORMAL
IC8
D-TYPE F-F
SEARCH
SEARCH MODE INDICATE
IC3
MNOS MEMORY
MEMORY DATA
CLK 15.625 KHz
IC4
A-D
C1-C3
DATA I/O
MCL
BD 1-2
DIGITAL TUNING
RA
A-D
AFT
CL
DOWN UP MOD
CLK
PWM PWMA
BINARY
BINARY
PWM
1MHz
H: AFT UP
M: FIX
L: AFT DOWN
H: FIX
L: CLEAR
RESET
H: FIX
M: DOWN
L: SEQ DOWN
DOWN
H: FIX
M: UP
L: SEQ UP
UP
UP INHIBIT
H: NORMAL AFT ON
M: NORMAL AFT OFF (FINE)
L: SEARCH MODE
IC7
IC10
SEARCH MODE INDICATE OSC
AFT SW
Q8 – Q10
BAND INDICATE
D16 – 18
IC12, Q5, Q6
PWM→VC CONV.
DC
0–33V ⇒ 0–2.6V
DC
IC8
CLK OSC
IC9
LEVEL INDICATER
D11 – 15
IC11
REMOCON UP-DOWN INHIBIT
H: DOWN
H: UP
A-D SIG
VC
CHANNEL DOWN
CHANNEL UP
BRI
H: VDD
M: 1/2 VDD
L: VSS
CH-3 BOARD

| D | C | B | A | CH | D | C | B | A | CH |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 7 |
| 0 | 0 | 0 | 1 | 2 | 0 | 1 | 1 | 1 | 8 |
| 0 | 0 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 9 |
| 0 | 0 | 1 | 1 | 4 | 1 | 0 | 0 | 1 | 10 |
| 0 | 1 | 0 | 0 | 5 | 1 | 0 | 1 | 0 | 11 |
| 0 | 1 | 0 | 1 | 6 | 1 | 0 | 1 | 1 | 12 |

| BD 1 | BD 2 | |
|---|---|---|
| H | H | VHF-LOW (BAND I) |
| L | H | VHF-HIGH (BAND III) |
| H | L | UHF (BAND U) |

| IN DC | LED ON |
|---|---|
| 0.2 | D11 |
| 0.4 | D11 ~ 12 |
| 0.6 | D11 ~ 13 |
| 0.8 | D11 ~ 14 |
| 1.0 | D11 ~ 15 |

## AUTO PROGRAME SEARCH TIMING CHART

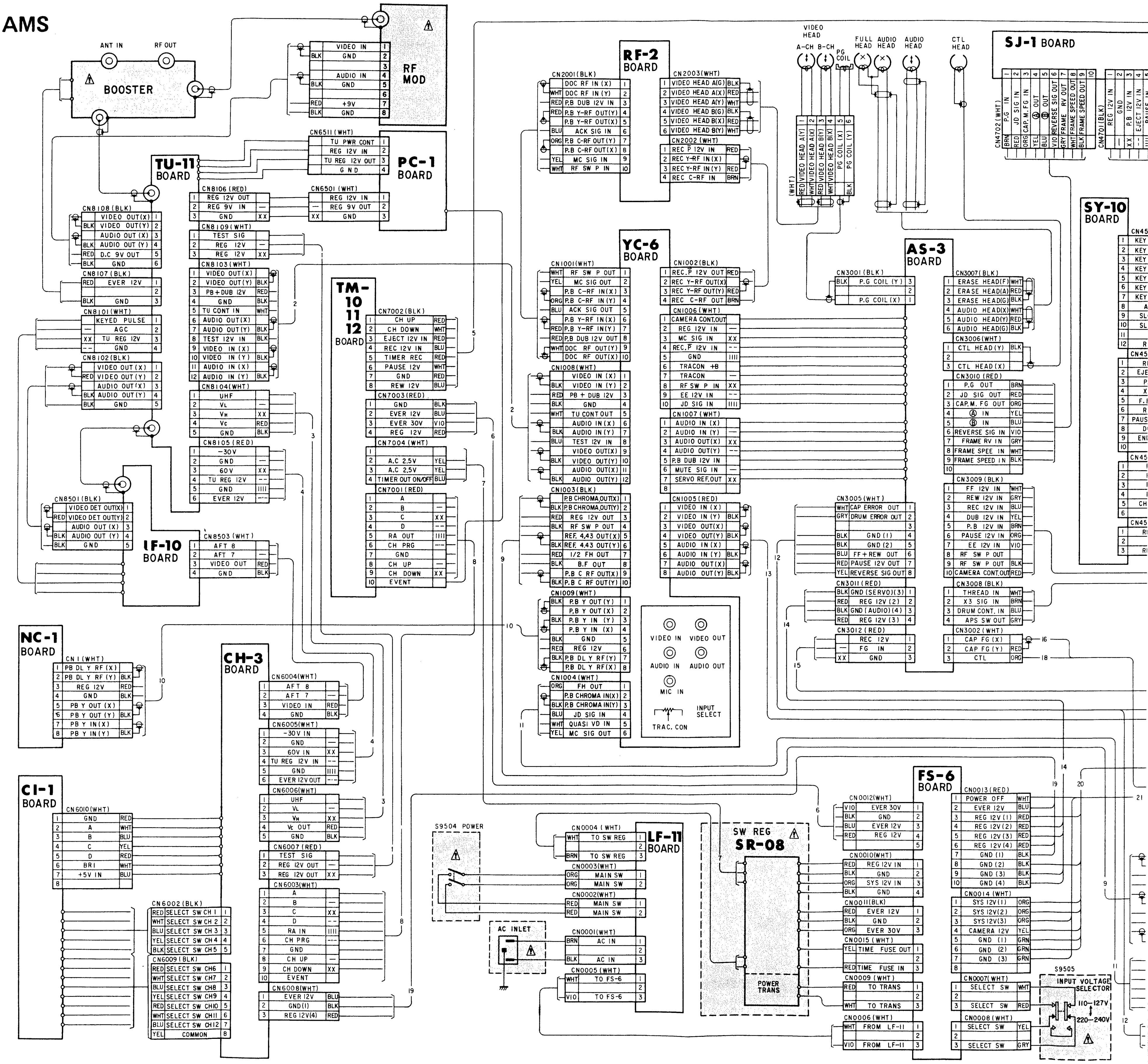


# SECTION 3

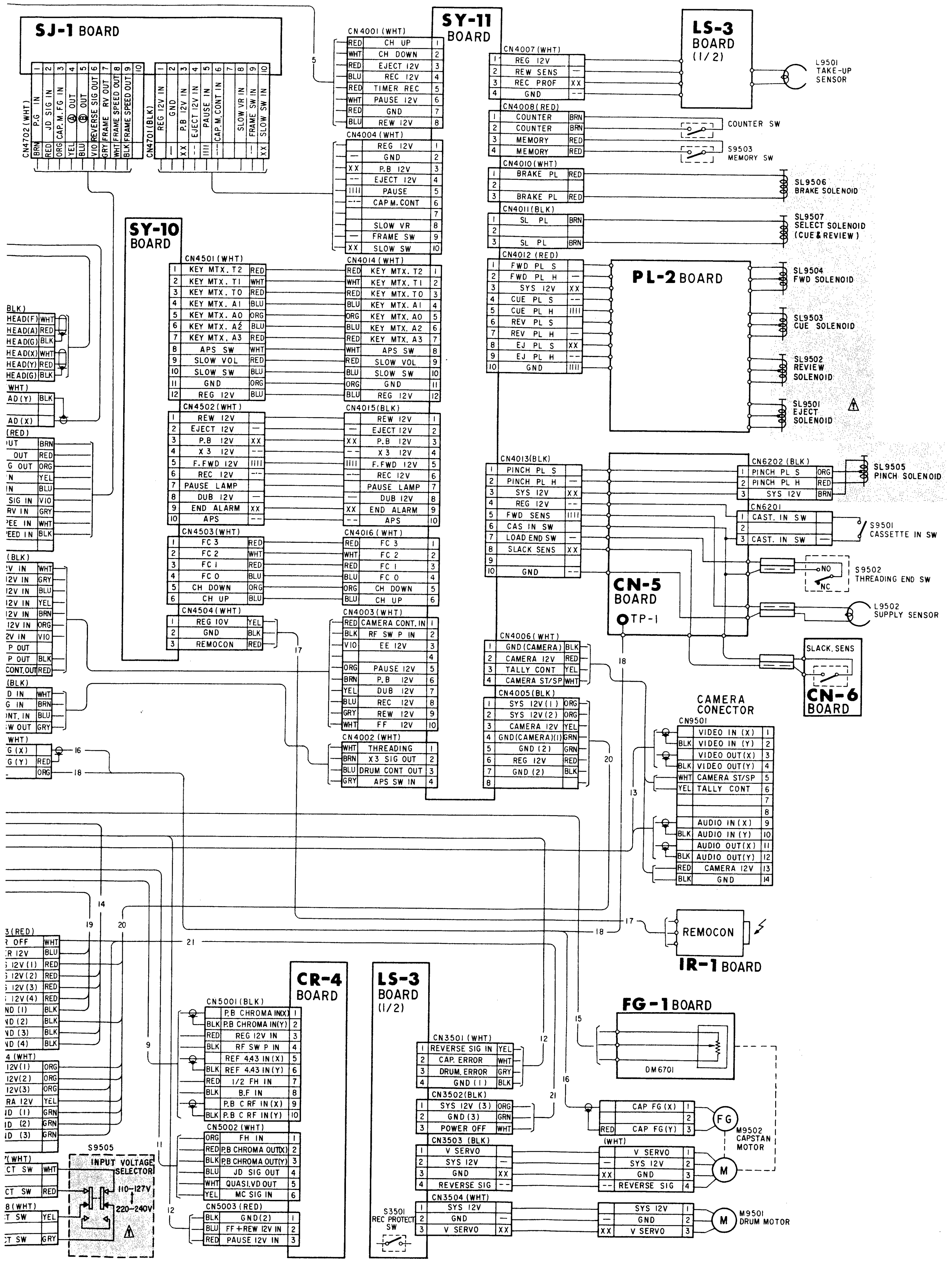
# PRINTED WIRING BOARD AND SCHEMATIC DIAGRAMS

## FRAME SCHEMATIC DIAGRAM

– Ref. No. CHASSIS : 9500 Series –


BOOSTER
ANT IN
RF OUT
RF MOD
TU-11 BOARD
PC-1 BOARD
TM-10 11 12 BOARD
LF-10 BOARD
NC-1 BOARD
CH-3 BOARD
CI-1 BOARD
RF-2 BOARD
YC-6 BOARD
AS-3 BOARD
SJ-1 BOARD
SY-10 BOARD
LF-11 BOARD
SW REG SR-08
POWER TRANS
FS-6 BOARD
S9504 POWER
AC INLET
S9505 INPUT VOLTAGE SELECTOR
110–127V
220–240V
VIDEO HEAD
A-CH B-CH
PG COIL
FULL AUDIO HEAD
AUDIO HEAD
CTL HEAD
VIDEO IN
VIDEO OUT
AUDIO IN
AUDIO OUT
MIC IN
INPUT SELECT
TRAC. CON

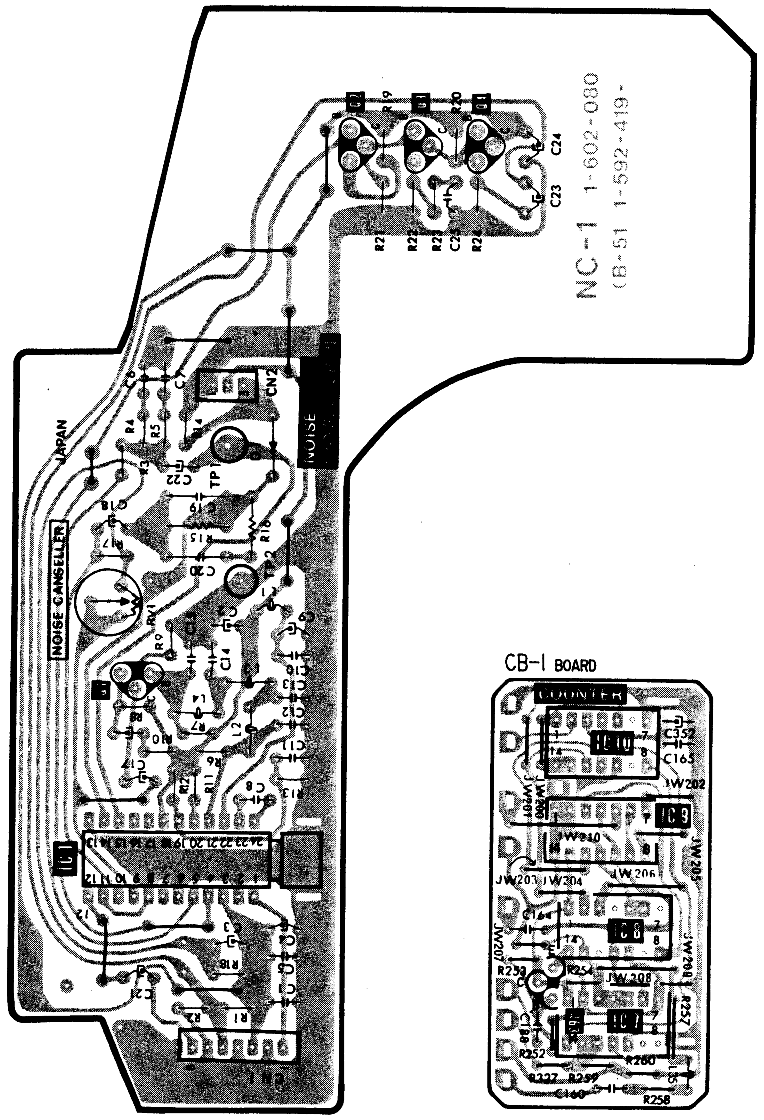
**The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.**


SJ-1 BOARD
CN4702 (WHT)
CN4701 (BLK)
SY-11 BOARD
CN4001 (WHT)
CN4004 (WHT)
CN4014 (WHT)
CN4015 (BLK)
CN4016 (WHT)
CN4003 (WHT)
CN4002 (WHT)
SY-10 BOARD
CN4501 (WHT)
CN4502 (WHT)
CN4503 (WHT)
CN4504 (WHT)
LS-3 BOARD (1/2)
CN4007 (WHT)
CN4008 (RED)
CN4010 (WHT)
CN4011 (BLK)
CN4012 (RED)
CN4013 (BLK)
CN4006 (WHT)
CN4005 (BLK)
L9501 TAKE-UP SENSOR
COUNTER SW
S9503 MEMORY SW
SL9506 BRAKE SOLENOID
SL9507 SELECT SOLENOID (CUE&REVIEW)
PL-2 BOARD
SL9504 FWD SOLENOID
SL9503 CUE SOLENOID
SL9502 REVIEW SOLENOID
SL9501 EJECT SOLENOID
CN6202 (BLK)
SL9505 PINCH SOLENOID
CN6201
S9501 CASSETTE IN SW
S9502 THREADING END SW
CN-5 BOARD
TP-1
L9502 SUPPLY SENSOR
SLACK SENS
CN-6 BOARD
CAMERA CONECTOR
CN9501
REMOCON
IR-1 BOARD
FG-1 BOARD
DM6701
CR-4 BOARD
CN5001 (BLK)
CN5002 (WHT)
CN5003 (RED)
LS-3 BOARD (1/2)
CN3501 (WHT)
CN3502 (BLK)
CN3503 (BLK)
CN3504 (WHT)
S3501 REC PROTECT SW
S9505 INPUT VOLTAGE SELECTOR
110-127V
220-240V
FG
M9502 CAPSTAN MOTOR
M
M9501 DRUM MOTOR

## NC-1 (NOISE CANCELLER), YC-6 (Y & CHROMA SIGNALS RECORD/PLAYBACK PROCESS), CB-1, RF-2 (LOW-CONVERTED CHROMA & Y-FM SIGNAL RECORD/PLAYBACK PROCESS) AND CR-4 (CHROMA PROCESS DURING VARIABLE PLAYBACK MODE)

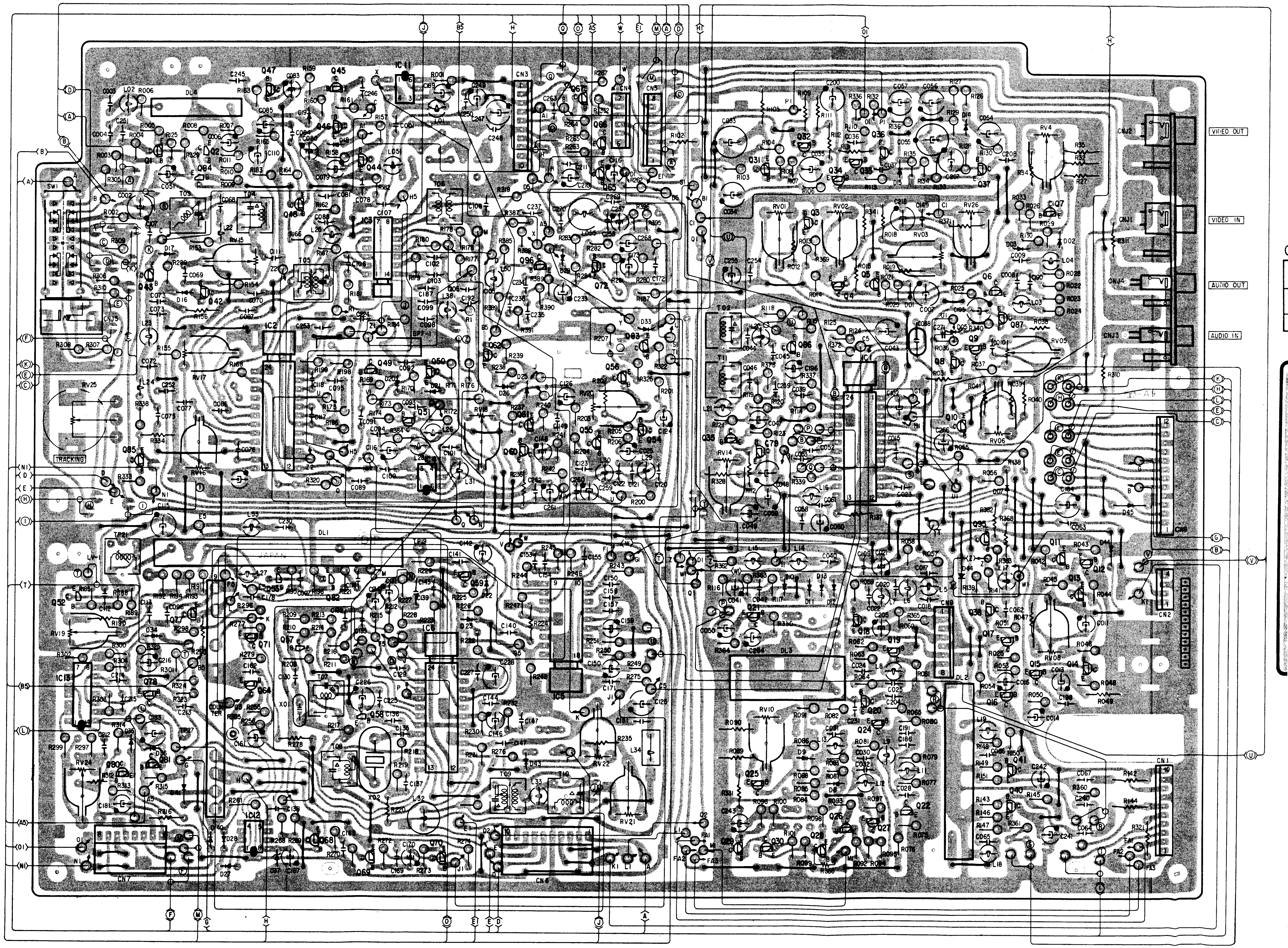
**PRINTED WIRING BOARDS**

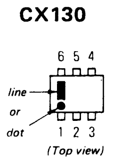
– Ref. No. NC-1 BOARD: 001 Series YC-6, CB-1 BOARDS: 1000 Series
RF-2 BOARD: 2000 Series CR-4 BOARD: 5000 Series CHASSIS: 9500 Series –

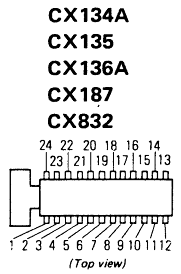

NC-1 1-602-080
(B-51 1-592-419-
NOISE CANCELLER
NOISE
JAPAN
CN2
CN1
TP
NC-1 BOARD
CB-1 BOARD
COUNTER
JW202
JW201
JW210
JW203
JW204
JW206
JW205
JW207
JW208
JW200
R253
R252
R254
R260
R227
R299
C160
R258
R257
C152
C165

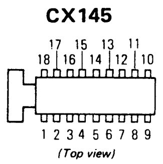
YC-6 BOARD

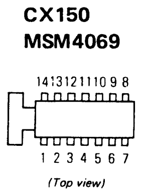
| | |
|---|---|
| IC / Q | IC13 52 80 78 43 85 1 81 77 42 2 84 47 IC2 71 64 IC12 48 53 57 45 46 82 68 44 69 IC3 49 IC11 51 50 58 IC4 IC6 70 59 62 61 96 60 67 IC5 66 72 65 56 55 83 54 35 29 25 31 79 21 30 86 32 3 28 34 4 33 IC1 26 5 36 18 27 20 24 19 22 10 37 8 9 95 6 38 87 16 17 41 40 7 11 15 12 14 13 |
| D | 35 34 17 36 41 16 40 28 27 37 19 18 20 21 23 22 26 25 48 29 33 9 10 11 13 8 12 15 1 5 14 44 3 7 2 44 45 |
| ADJ | RV25 RV19 RV24 LV-1 RV16 RV17 RV15 RV18 RV22 RV20 RV21 RV14 RV01 RV10 RV02 RV03 RV26 RV06 RV4 RV05 RV08 |

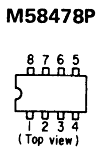

VIDEO OUT
VIDEO IN
AUDIO OUT
AUDIO IN
CN12
CN11
CN14
CN13
CN1
CN2
CN3
CN4
CN5
CN6
CN7
IC1
IC2
IC5
IC11
IC12
IC13
DL1
DL2
DL3
DL4
TRACKING
RV25
RV19
RV24
RV01
RV02
RV03
RV04
RV05
RV06
RV10
RV21
RV22
RV26
SW1
LV-1
TP21
JAPAN


CX130
6 5 4
line or dot
1 2 3
(Top view)

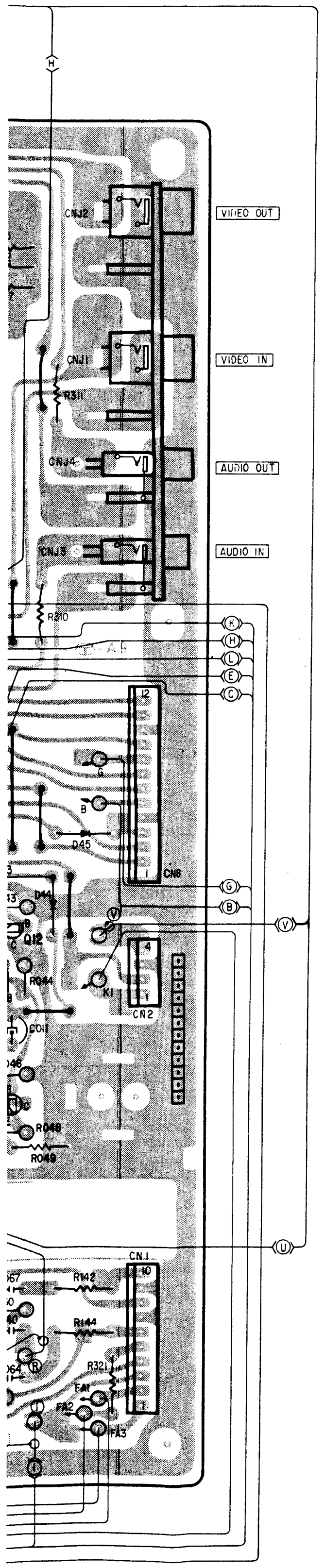

CX134A
CX135
CX136A
CX187
CX832
24 22 20 18 16 14
23 21 19 17 15 13
1 2 3 4 5 6 7 8 9 10 11 12
(Top view)


CX145
17 15 13 11
18 16 14 12 10
1 2 3 4 5 6 7 8 9
(Top view)


CX150
MSM4069
14 13 12 11 10 9 8
1 2 3 4 5 6 7
(Top view)

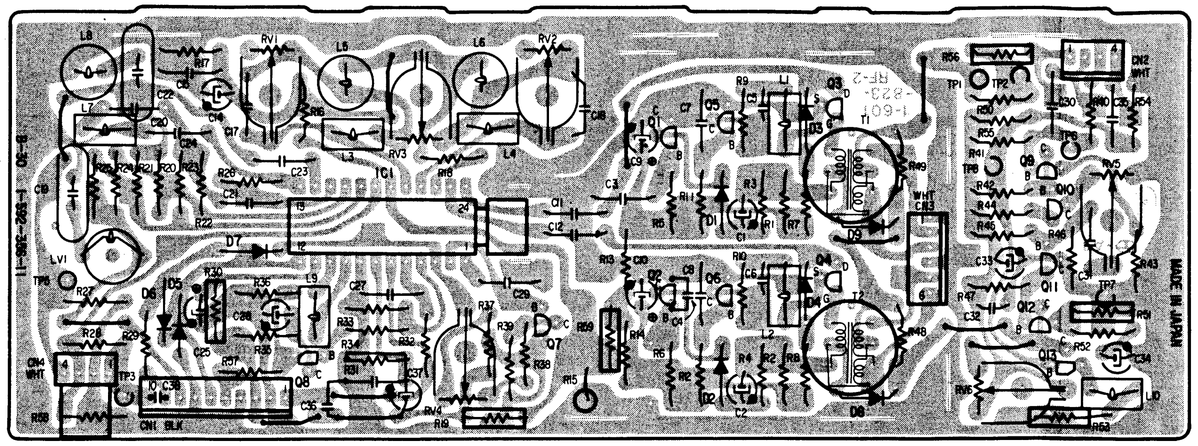

M58478P
8 7 6 5
1 2 3 4
(Top view)

| | |
|---|---|
| 1 12 13<br>14 | IC<br>Q |
| 2 45 44 | D |
| RV08 | ADJ |


VIDEO OUT
VIDEO IN
AUDIO OUT
AUDIO IN
CN1
CN2
CN6
R310
R311
D45
R044
R048
R049
R142
R144
R321

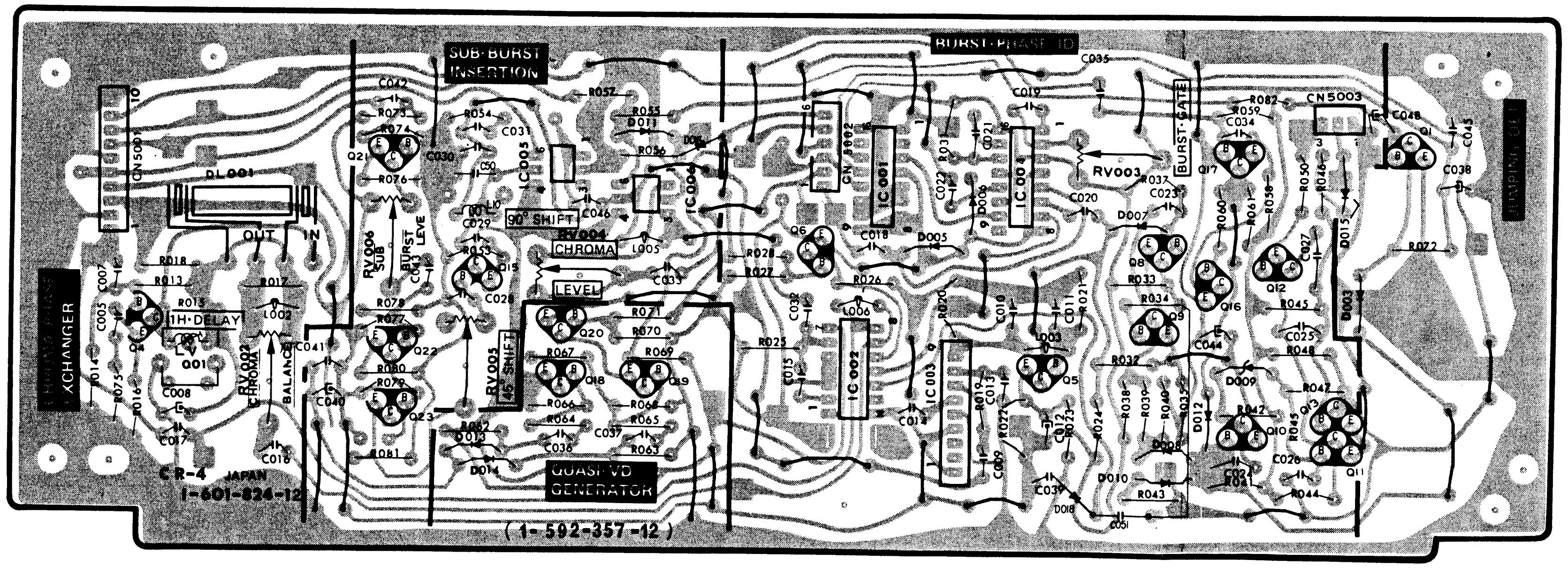
RF-2 BOARD

| | | |
|---|---|---|
| IC<br>Q | 8 IC1 7 1 2 5 6 3 4 9 10 11 12 13 | IC<br>Q |
| D | 6,5 7 1 2 3 4 9 8 | D |
| ADJ | RV1 RV3 RV4 RV2 RV6 RV5 | ADJ |

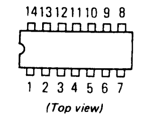

RF-2
1-602-823-11
MADE IN JAPAN
CN1 BLK
CN2 WHT
CN3 WHT
CN4 WHT
RV1
RV2
RV3
RV4
RV5
RV6
IC1
LV1
TP1
TP2
TP3
TP6
TP7

CR-4 BOARD

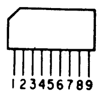
| | | |
|---|---|---|
| Q<br>IC | 4 21 22 23 15 IC005 20 18 IC006 19 6 IC002 IC001 IC003 IC004 5 8 9 16 17 10 12 13 11 1 | Q<br>IC |
| D | 013 014 011 016 005 006 018 007 008 010 012 015 003 | D |
| ADJ | LV001 RV002 RV006 RV005 RV004 RV003 | ADJ |


SUB-BURST INSERTION
BURST-PHASE ID
BURST GATE
90° SHIFT
CHROMA
LEVEL
SUB BURST LEVEL
1H-DELAY
DL001
OUT
IN
BALANCE
XCHANGER
QUASI-VD GENERATOR
CN5001
CN5002
CN5003
IC001
IC002
IC003
IC004
RV003
RV004
RV005
RV006
CR-4 JAPAN
1-601-824-12
(1-592-357-12)

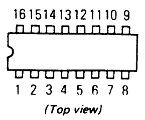
**SN74LS10N**
**SN74LS74AN**
**SN74LS93N**


14 13 12 11 10 9 8
1 2 3 4 5 6 7
(Top view)

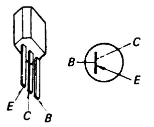
**TA7320P**



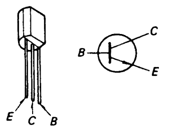
**TC4027BP**
**TC4528BP**


16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8
(Top view)

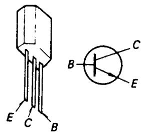
**2SA1027R**
**2SA844**



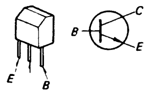
**2SC1364**



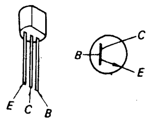
**2SC403C**



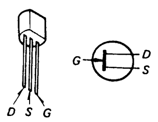
**2SC535**



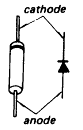
**2SC2001**



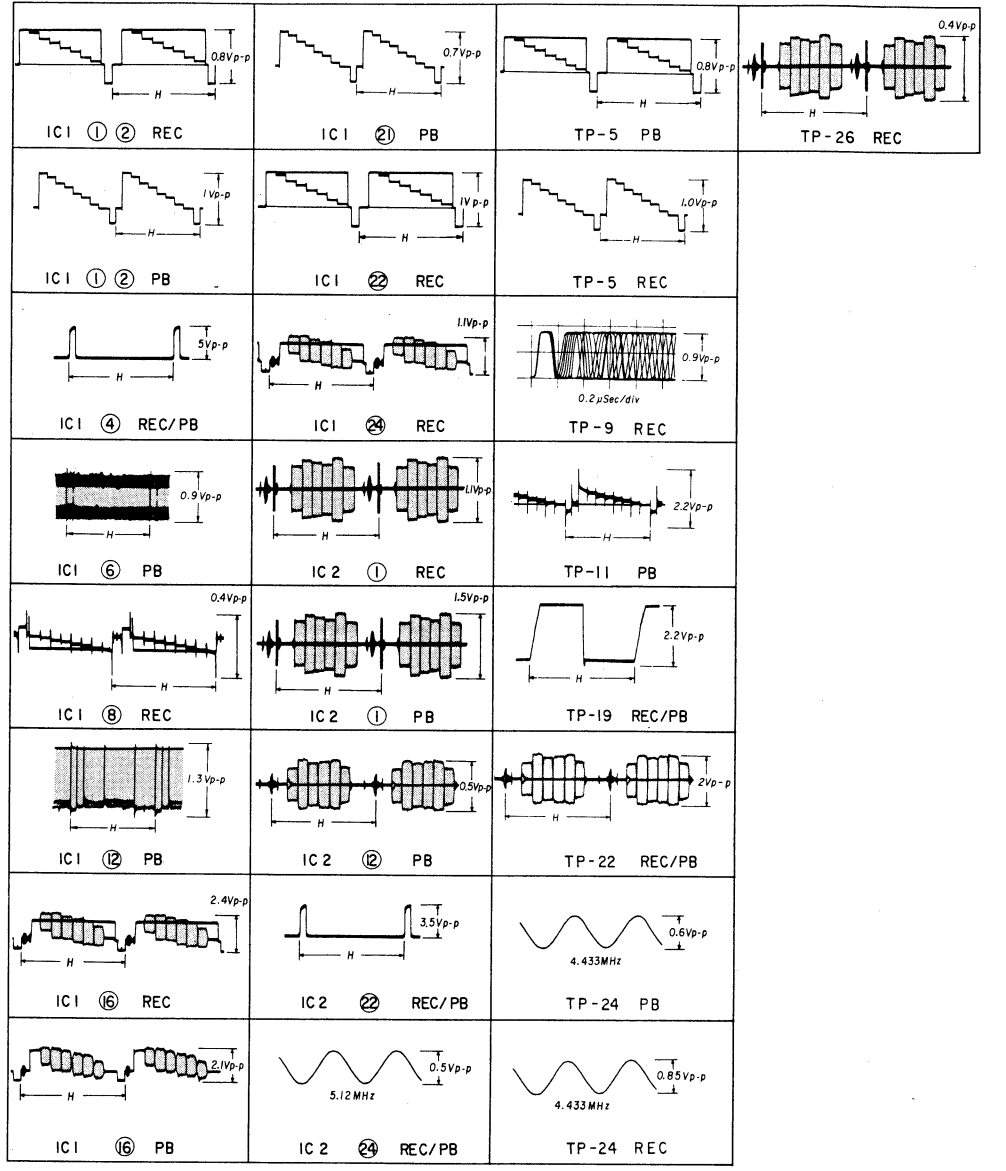
**2SK152**



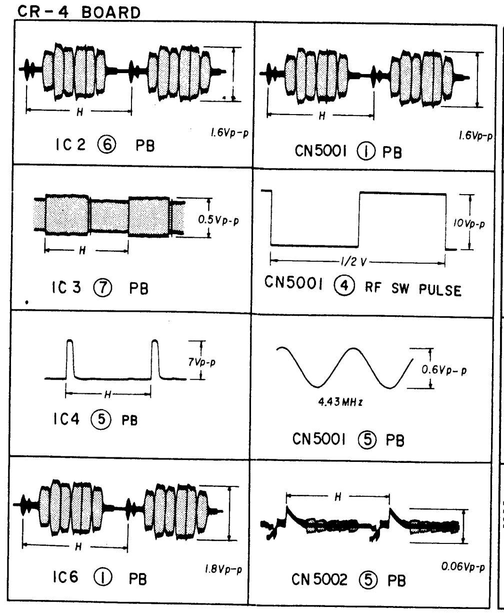
**1S1555**
**RD5.6E-B2Z**
**RD6.2E**


cathode
anode

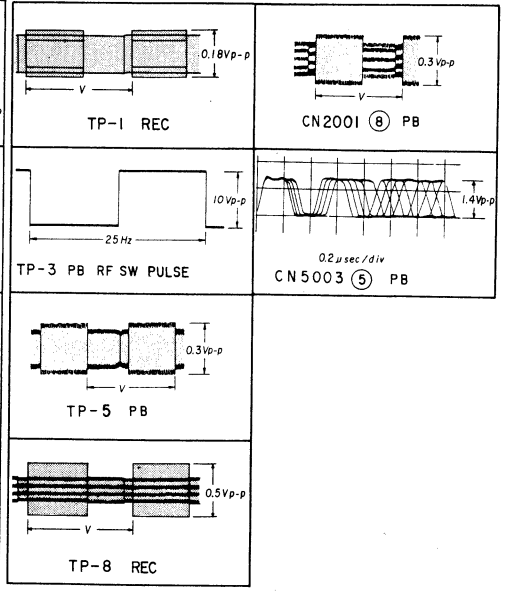
YC-6 BOARD



CR-4 BOARD

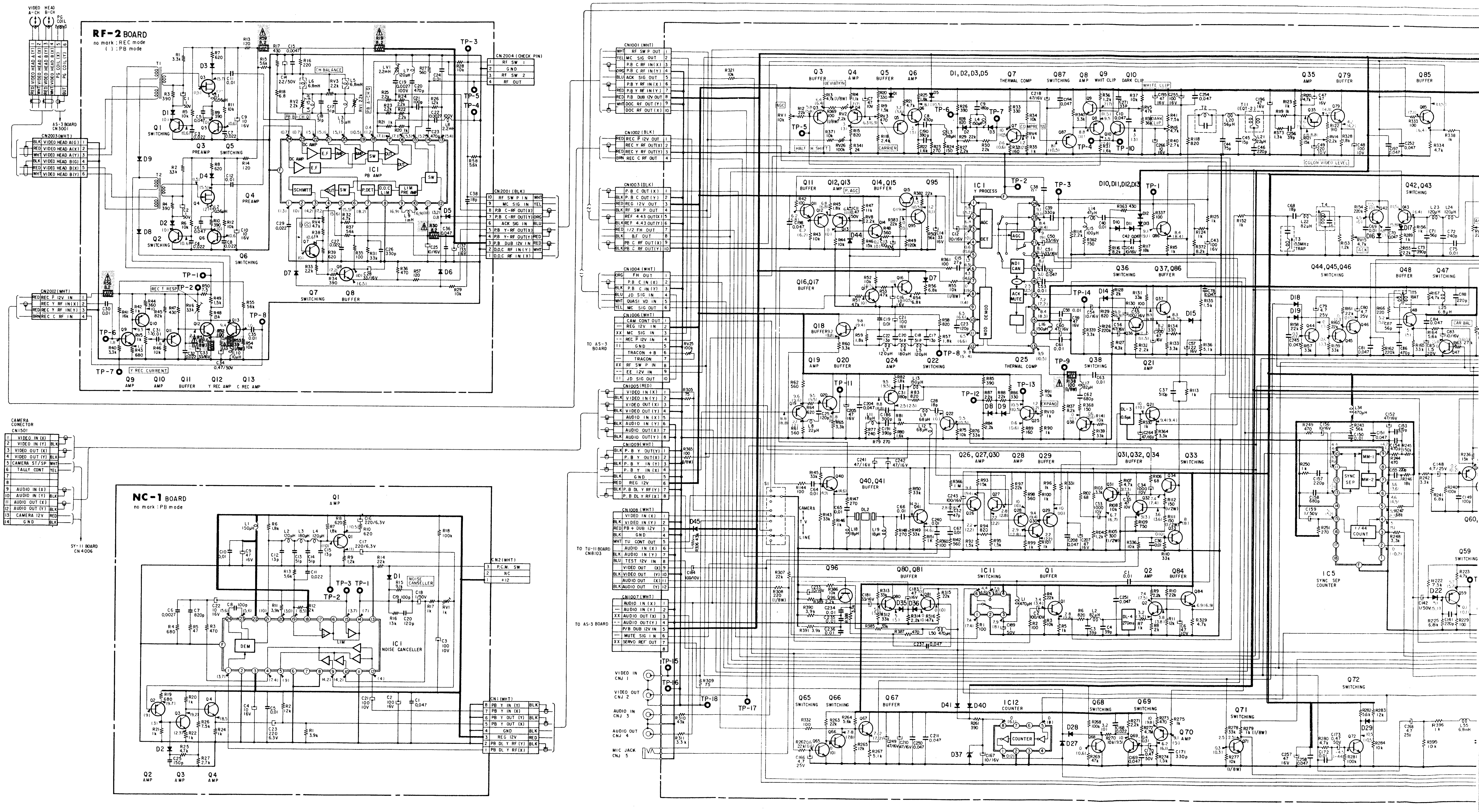


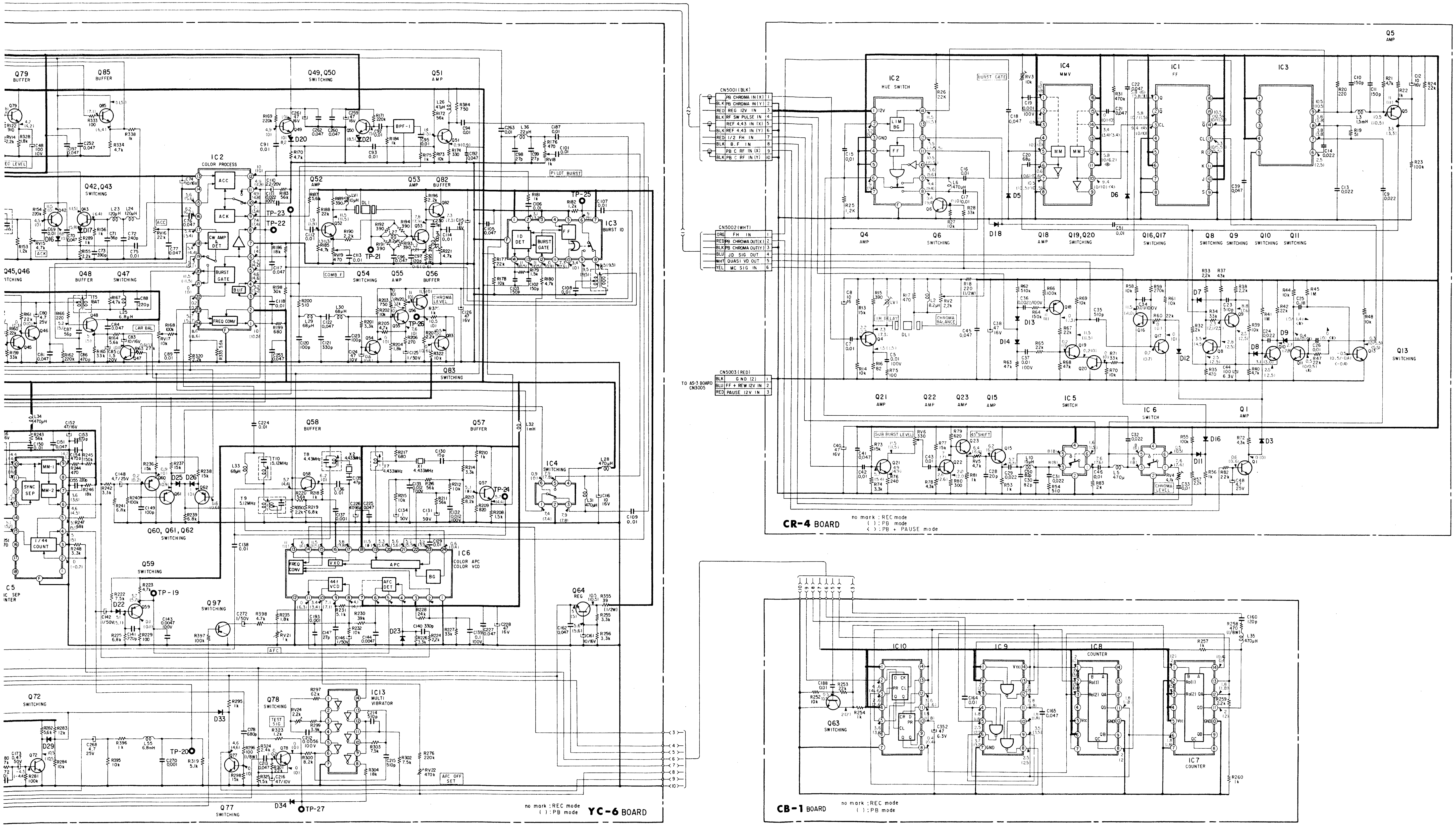
RF-2 BOARD



## NC-1 (NOISE CANCELLER), YC-6 (Y & CHROMA SIGNALS RECORD/PLAYBACK PROCESS), CB-1, RF-2 (LOW-CONVERD CHROMA & Y-FM SIGNAL RECORD/PLAYBACK PROCESS) AND CR-4 (CHROMA PROCESS DURING VARIABLE PLAYBACK MODE) BOARDS SCHEMATIC DIAGRAM

– Ref. No. NC-1 BOARD: 001 Series YC-6, CB-1 BOARDS: 1000 Series RF-2 BOARD: 2000 Series CR-4 BOARD: 5000 Series CHASSIS: 9500 Series –


RF-2 BOARD
no mark : REC mode
( ) : PB mode
VIDEO HEAD A-CH B-CH
PG COIL
AS-3 BOARD CN3001
CN2003 (WHT)
CN2002 (WHT)
CN2004 (CHECK PIN)
CN2001 (BLK)
IC1 PB AMP
TP-1
TP-2
TP-3
TP-4
TP-5
TP-6
TP-7
TP-8
Q1 SWITCHING
Q2 SWITCHING
Q3 PREAMP
Q4 PREAMP
Q5 SWITCHING
Q6 SWITCHING
Q7 SWITCHING
Q8 BUFFER
Q9 AMP
Q10 AMP
Q11 BUFFER
Q12 Y REC AMP
Q13 C REC AMP
CH BALANCE
REC I RESP
Y REC CURRENT
CAMERA CONECTOR CN1501
SY-11 BOARD CN4006
NC-1 BOARD
no mark : PB mode
IC1 NOISE CANCELLER
NOISE CANCELLER
DEM
LIM
CN2 (WHT)
CN1 (WHT)
Q1 AMP
Q2 AMP
Q3 AMP
Q4 AMP
CN1001 (WHT)
CN1002 (BLK)
CN1003 (BLK)
CN1004 (WHT)
CN1006 (WHT)
CN1005 (RED)
CN1009 (WHT)
CN1008 (WHT)
CN1007 (WHT)
TO AS-3 BOARD
TO TU-11 BOARD CN8103
VIDEO IN CNJ 1
VIDEO OUT CNJ 2
AUDIO IN CNJ 3
AUDIO OUT CNJ 4
MIC JACK CNJ 5
IC1 Y PROCESS
AGC
DET
NOI CAN
ACK MUTE
MOD
DEMOD
IC5 SYNC SEP COUNTER
SYNC SEP
MM-1
MM-2
1/44 COUNT
IC11 SWITCHING
IC12 COUNTER
COUNTER
HALF H SHIFT
CARRIER
DEVIATION
WHITE CLIP
DARK CLIP
COLOR VIDEO LEVEL
EXPAND
CAR BAL
3.58MHz TRAP
S1 CAMERA TV LINE
DL-2
DL-3
DL-4
TP-9
TP-10
TP-11
TP-12
TP-13
TP-14
TP-15
TP-16
TP-17
TP-18


Q79 BUFFER
Q85 BUFFER
Q49, Q50 SWITCHING
Q51 AMP
IC2 COLOR PROCESS
ACC
ACK
CW AMP DET
BURST GATE
FREQ CONV
BUF
Q42, Q43 SWITCHING
Q45, Q46 SWITCHING
Q48 BUFFER
Q47 SWITCHING
Q52 AMP
Q53 AMP
Q82 BUFFER
Q54 SWITCHING
Q55 AMP
Q56 BUFFER
Q83 SWITCHING
IC3 BURST ID
ID DET
BURST GATE
FF
BPF-1
PILOT BURST
COMB F
CHROMA LEVEL
CAR BAL
TP-21
TP-22
TP-23
TP-25
TP-26
Q58 BUFFER
Q57 BUFFER
Q60, Q61, Q62 SWITCHING
IC4 SWITCHING
IC6 COLOR APC COLOR VCO
FREQ CONV
VXO
APC
BG
441 VCO
AFC DET
Q59 SWITCHING
Q97 SWITCHING
Q64 REG
TP-19
TP-24
AFC
IC5 SYNC SEP COUNTER
SYNC SEP
MM-1
MM-2
1/44 COUNT
Q72 SWITCHING
Q77 SWITCHING
Q78 SWITCHING
IC13 MULTI VIBRATOR
TEST SIG
AFC OFF SET
TP-20
TP-27
D34
no mark : REC mode
( ) : PB mode
YC-6 BOARD
CN5001 (BLK)
PB CHROMA IN (X)
PB CHROMA IN (Y)
REG 12V IN
RF SW PULSE IN
REF 4.43 IN (X)
REF 4.43 IN (Y)
1/2 FH IN
B. F. IN
PB C RF IN (X)
PB C RF IN (Y)
CN5002 (WHT)
FH IN
PB CHROMA OUT (X)
PB CHROMA OUT (Y)
JD SIG OUT
QUASI VD OUT
MC SIG IN
CN5003 (RED)
GND (2)
FF + REW 12V IN
PAUSE 12V IN
TO AS-3 BOARD CN3005
IC2 HUE SWITCH
IC4 MMV
IC1 FF
IC3
Q5 AMP
BURST GATE
Q4 AMP
Q6 SWITCHING
Q18 AMP
Q19, Q20 SWITCHING
Q16, Q17 SWITCHING
Q8 SWITCHING
Q9 SWITCHING
Q10 SWITCHING
Q11 SWITCHING
Q13 SWITCHING
1H DELAY
CHROMA BALANCE
Q21 AMP
Q22 AMP
Q23 AMP
Q15 AMP
IC5 SWITCH
IC6 SWITCH
Q1 AMP
SUB BURST LEVEL
45° SHIFT
CHROMA LEVEL
CR-4 BOARD
no mark : REC mode
( ) : PB mode
⟨ ⟩ : PB + PAUSE mode
IC10
IC9
IC8 COUNTER
IC7 COUNTER
Q63 SWITCHING
CB-1 BOARD
no mark : REC mode
( ) : PB mode

**NOTES:**

- All resistors are in ohms, ¼ W unless otherwise noted. kΩ = 1000Ω ; MΩ = 1000kΩ
- All capacitors are in μF unless otherwise noted. p : μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ⊡ : nonflammable resistor.
- The red lines show the main voltages.
- All voltages are dc measured with a VOM (20kΩ/V).

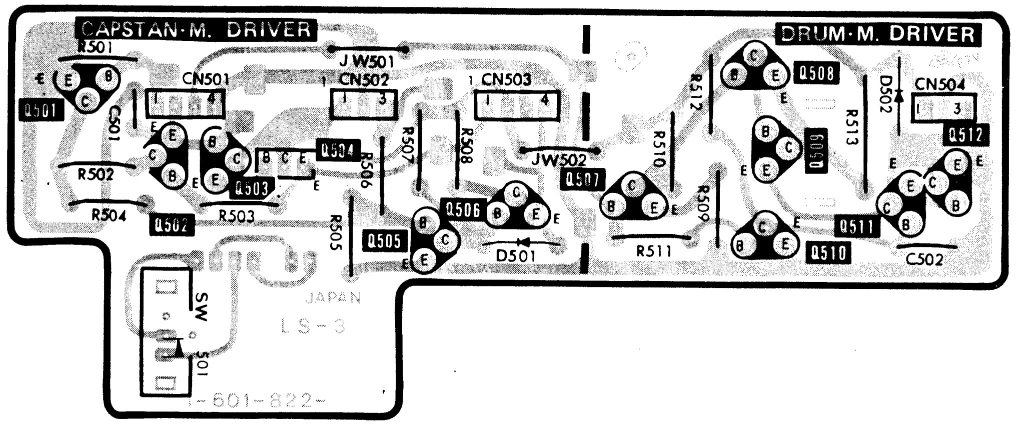
**The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.**

## AS-3 (SERVO, AUDIO RECORD/PLAYBACK PROCESS), LS-3 (CAPSTAN & DRUM MOTOR DRIVE), SJ-1 (SERVO CONTROL DURING VARIABLE PLAYBACK MODE) AND FG-1 (CAPSTAN FLY FG) PRINTED WIRING BOARDS

– Ref. No. AS-3 BOARD : 3000 Series LS-3 BOARD : 3500 Series SJ-1 BOARD : 4700 Series FG-1 BOARD : 6700 Series CHASSIS : 9500 Series –

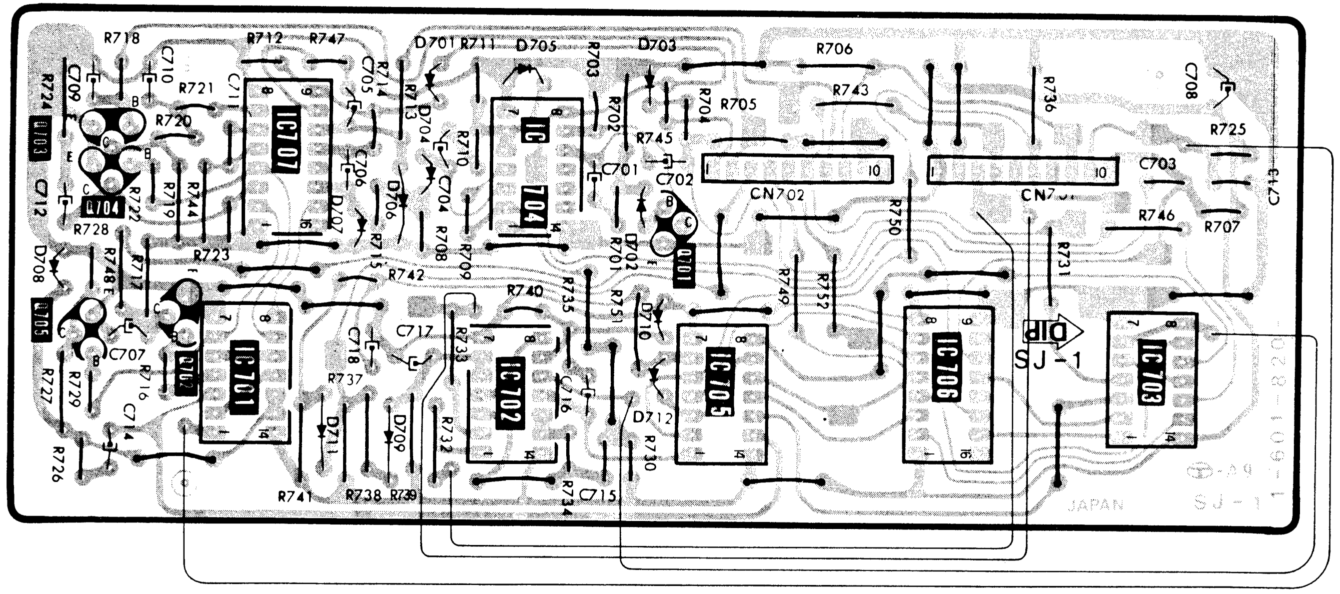
### LS-3 BOARD

| | | |
|---|---|---|
| Q | 501 502 503 504 505 506 507 508 509 510 511 512 | Q |
| D | 501 502 | D |

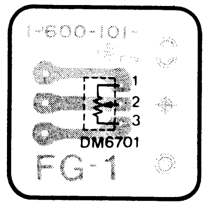

CAPSTAN·M. DRIVER
DRUM·M. DRIVER
CN501
CN502
CN503
CN504
JW501
JW502
Q501
Q502
Q503
Q504
Q505
Q506
Q507
Q508
Q509
Q510
Q511
Q512
D501
D502
C501
C502
R501
R502
R503
R504
R505
R506
R507
R508
R509
R510
R511
R512
R513
SW501
JAPAN
LS-3
-501-822-

### SJ-1 BOARD

| | | |
|---|---|---|
| IC,Q | 705 703 704 702 IC701 IC707 IC702 IC704 701 IC705 IC706 IC703 | IC,Q |
| D | 708 711 707 706 709 701 704 705 702 703 710 712 | D |

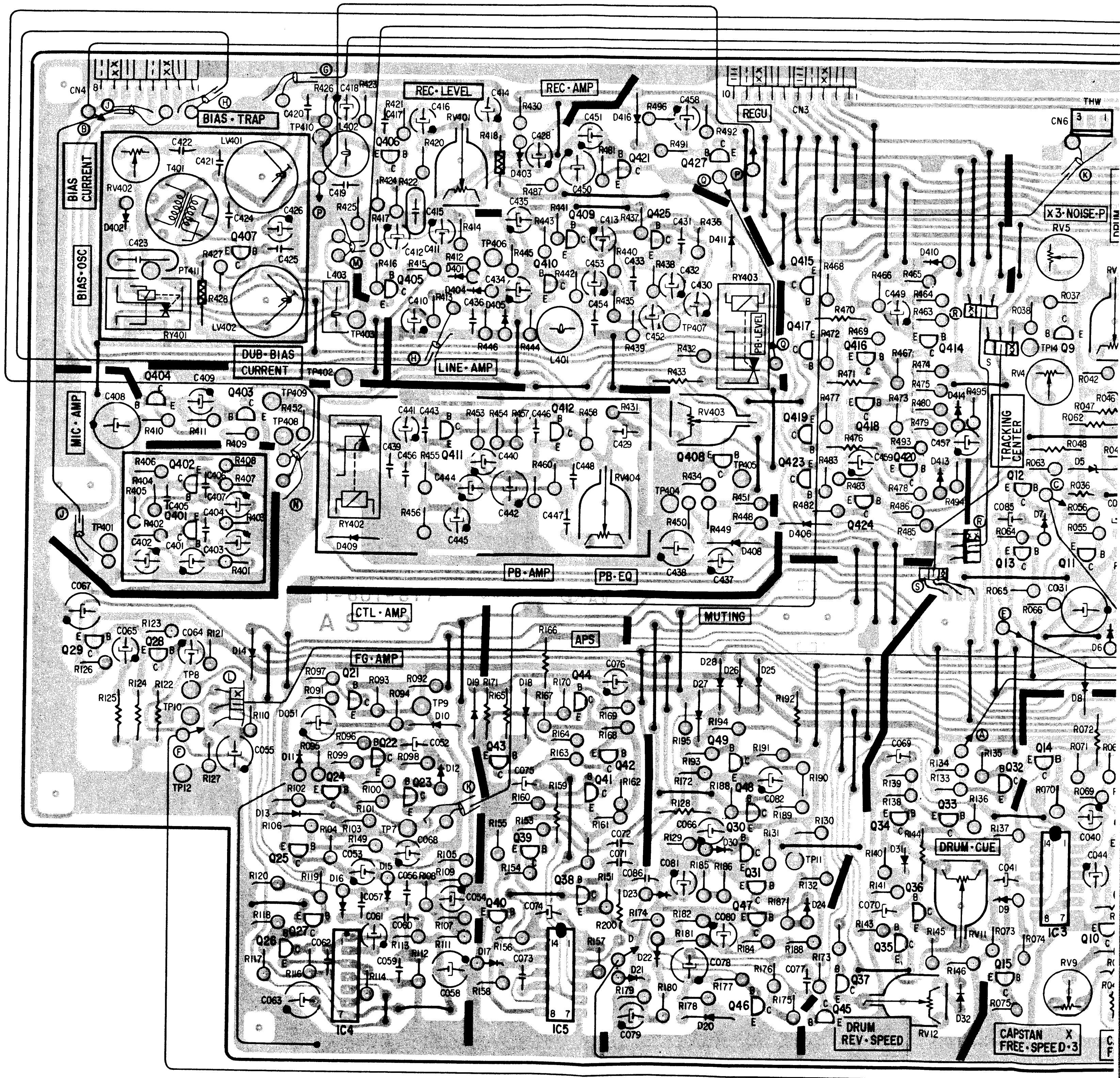

IC701
IC702
IC703
IC704
IC705
IC706
IC707
CN702
CN703
SJ-1
JAPAN

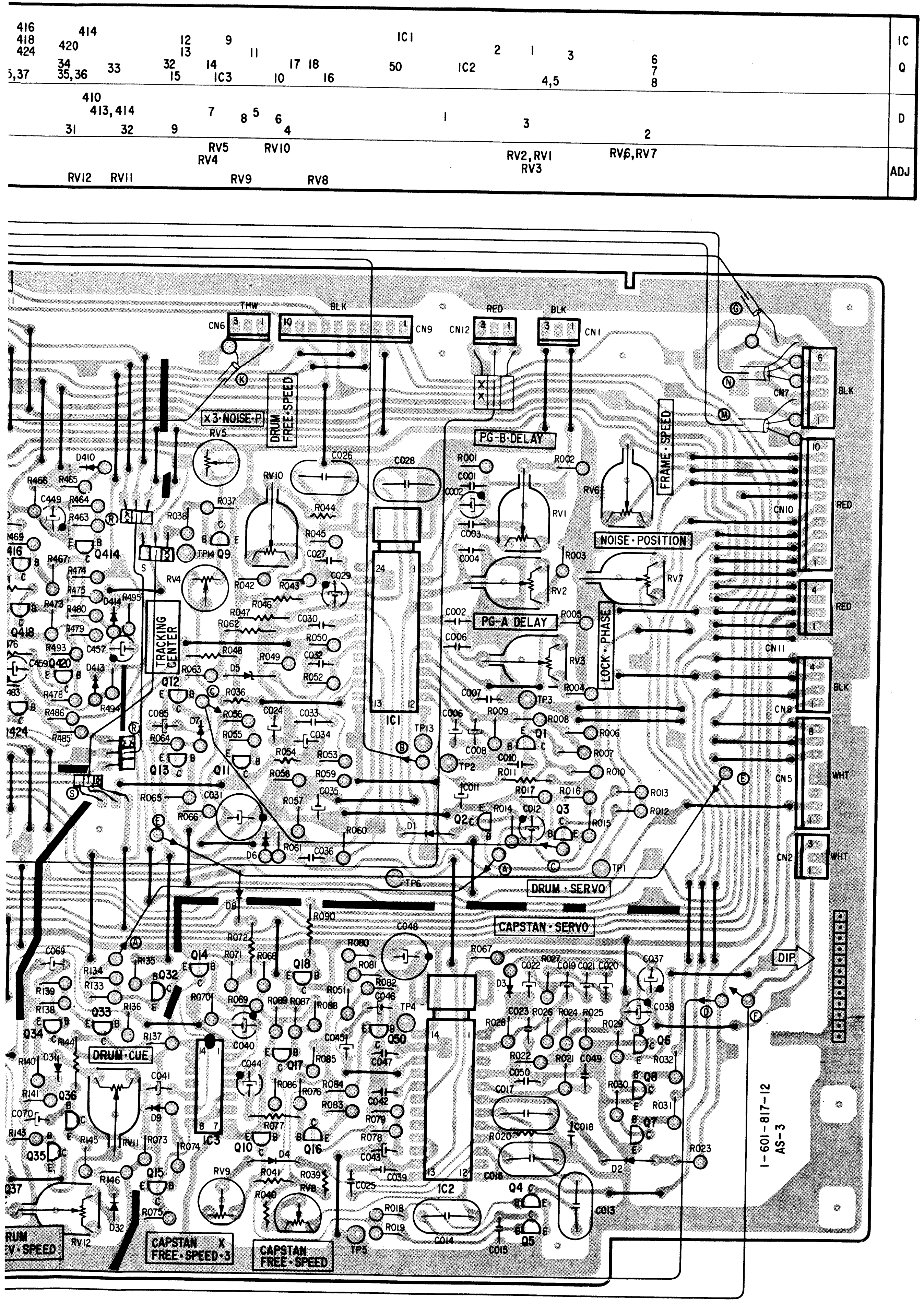
### FG-1 BOARD


1-600-101-
DM6701
FG-1

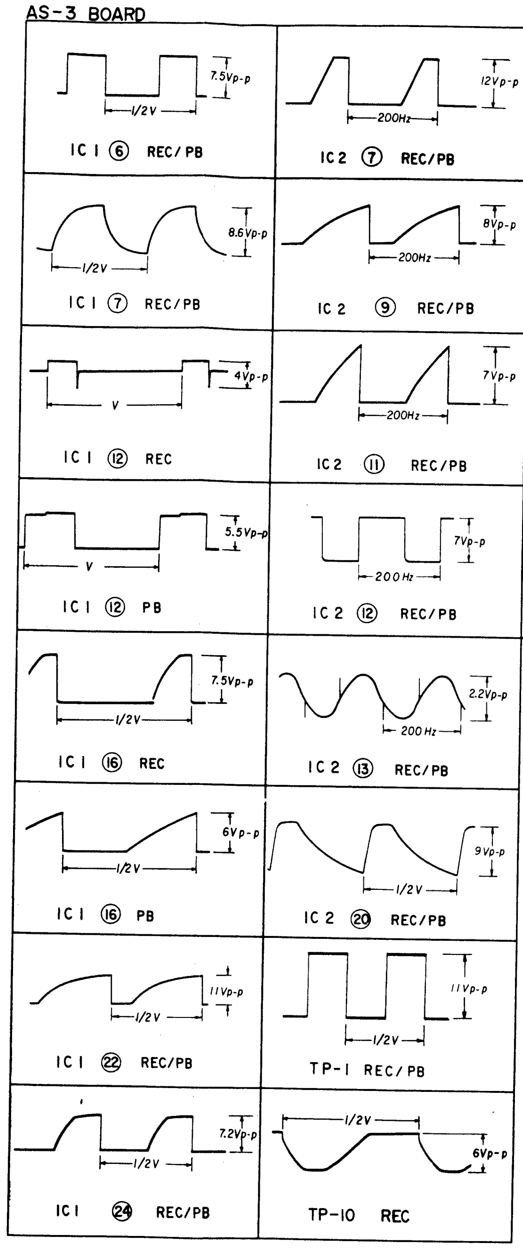
### AS-3 BOARD

| | |
|---|---|
| IC<br>Q | 29 404 28 402 401 407 403 26 25 27 24 21 IC4 406 405 22,23 411 43 40 39 410 412 409 44 IC5 41, 42 38 421 425 427 408 49,30,31,48 47,46 415,417 419,423 416 418 424 45,37 414 420 34 35,36 33 32 15 12 13 14 IC3 9 11 |
| D | 402 14 11 13 409 16 15 401, 404 10,12 19 17 405 403 18 416 21 23 22 411 408 27,28,26,25 20,30 406 24 410 413,414 31 32 9 7 8 5 |
| ADJ | RV402 LV401 LV402 RV401 RV404 RV403 RV12 RV11 RV5 RV4 RV9 |


BIAS·TRAP
REC·LEVEL
REC·AMP
REGU
BIAS CURRENT
BIAS·OSC
DUB·BIAS CURRENT
LINE·AMP
MIC·AMP
PB·AMP
PB·EQ
PB·LEVEL
X 3·NOISE·P
TRACKING CENTER
CTL·AMP
APS
MUTING
FG·AMP
DRUM·CUE
DRUM REV·SPEED
CAPSTAN X FREE·SPEED·3
IC3
IC4
IC5
CN3
CN4
CN6
AS-3


IC
Q
D
ADJ
416 418 424
414
420
34
35,36
,37
33
12 13
9
11
IC1
2 1 3
6 7 8
32 15
14 IC3
17 18
10
16
50
IC2
4,5
410
413,414
31 32 9
7 8 5 6 4
1
3
2
RV5 RV4
RV10
RV2,RV1 RV3
RV6,RV7
RV12 RV11
RV9
RV8
CN6
CN9
CN12
CN1
CN7
CN10
CN11
CN8
CN5
CN2
THW
BLK
RED
WHT
X3·NOISE·P
DRUM FREE·SPEED
PG-B·DELAY
FRAME·SPEED
NOISE·POSITION
PG-A DELAY
LOCK·PHASE
TRACKING CENTER
DRUM·SERVO
CAPSTAN·SERVO
DRUM·CUE
DIP
CAPSTAN X FREE·SPEED·3
CAPSTAN FREE·SPEED
DRUM REV·SPEED
1-601-817-12
AS-3

AS-3 BOARD



AS-3 BOARD

CUE/REV MODE

| | Q1 | Q12 | Q13 | Q16 | Q43 | Q44 | Q45 | Q46 | Q47 | Q48 | Q49 | Q35 (CUE MODE ONLY) | Q37 (REV MODE ONLY) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B | * | 0 | 0 | 12.5 | 0.6 | 0.6 | 0.6 | 0 | 0.6 | 11 | 0.6 | 7.6 | 7.6 |
| C | GND | 1.2 | 0.6 | 11.5 | 0 | 0 | 0 | 5.7 | 0 | 11.5 | 0 | 7 | 7 |
| E | * | GND | GND | 11.5 | GND | GND | GND | GND | GND | 11.5 | GND | 7 | 7 |

IC 1

| PIN NO. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VOLTAGE | * | 3.4 | 3.6 | 5.3 | 3 | 3 | 5.7 | * | * | * | 3 | 1.9 | 6 | 11.5 | 2.8 | 2.1 | 5.1 | 7.4 | * | * | 1.8 | * | 3.7 | * |

IC 2

| PIN NO. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 CUE | 20 REV | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VOLTAGE | 2.3 | 5.4 | 5.4 | 3.2 | 0.8 | 5.4 | 3.8 | 5.8 | 2.8 | 4.1 | 1.8 | 4.1 | 4.3 | GND | GND | GND | — | — | 11.5 | 3.8 | 4.8 | 0.9 | * | * | 11.5 |

X3 MODE

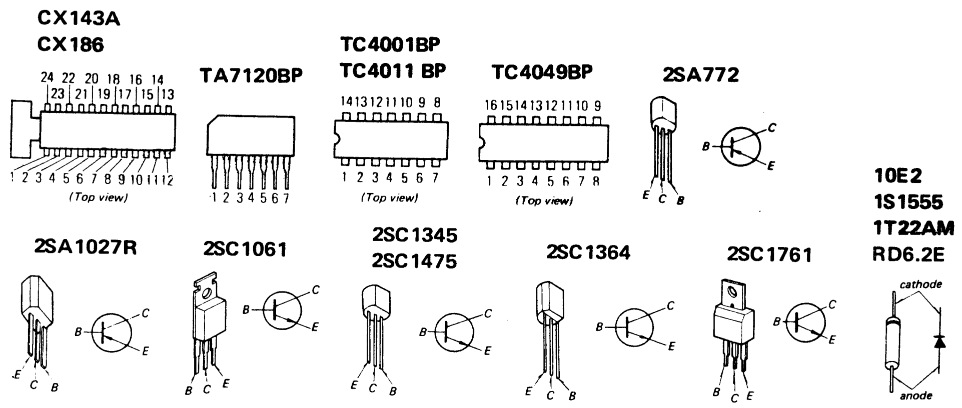
IC 2

| PIN NO. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VOLTAGE | 7 | 5.4 | 5.8 | 3.4 | 0.3 | 5.8 | 0.4 | 5.8 | 3.6 | 3.9 | 3.4 | 3.9 | 4.3 | GND | GND | GND | — | — | 11.5 | 5.8 | * | * | 5 | 11.5 |

| | Q4 | Q5 | Q6 | Q10 | Q17 | Q18 | Q48 | Q49 | Q50 |
|---|---|---|---|---|---|---|---|---|---|
| B | 0 | 0 | 4.6 | 0 | 0.6 | 11.5 | 11 | 0.6 | 5 |
| C | 0 | 2.5 | GND | 4.7 | 0 | 11.5 | 11.5 | 0 | GND |
| E | GND | GND | 8.1 | GND | GND | 11 | 11.5 | GND | 5.6 |

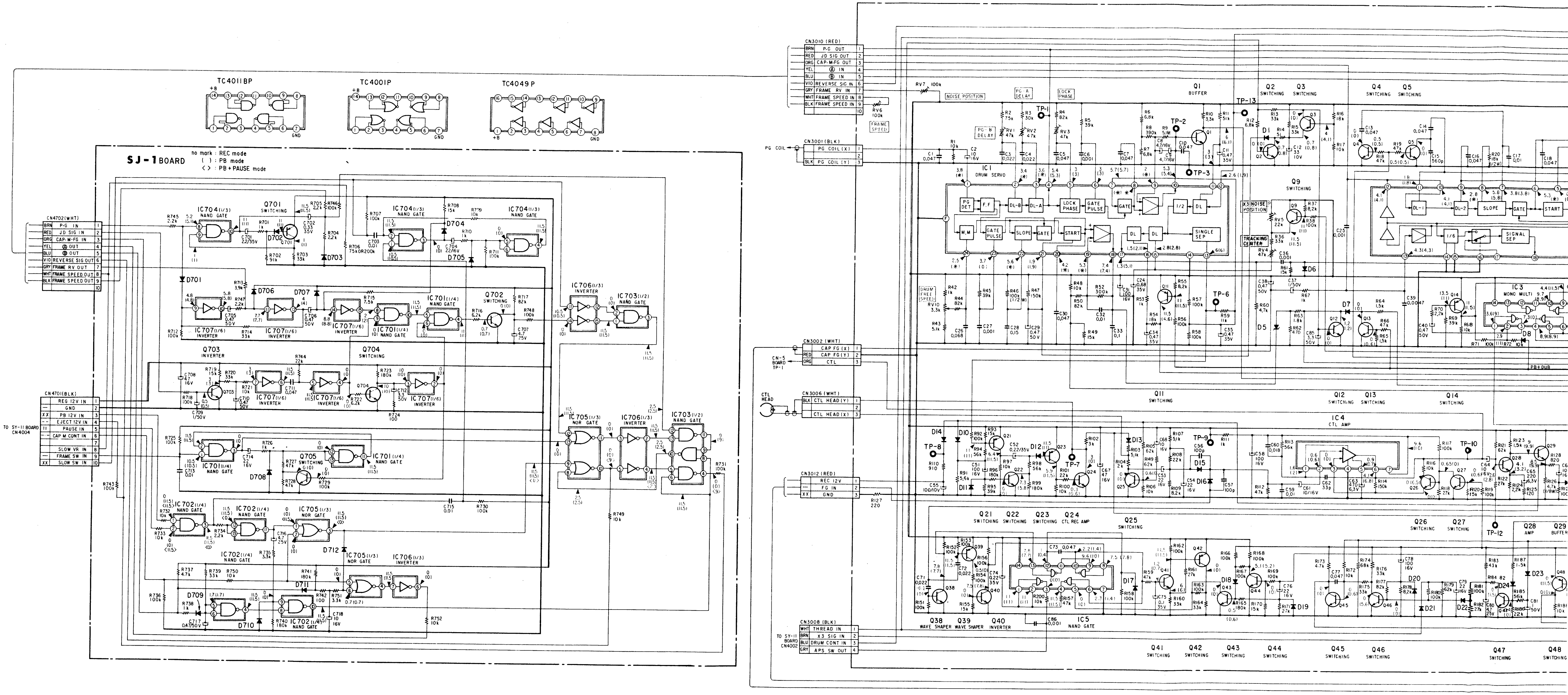
DUB MODE

| | Q405 | Q408 | Q417 | Q418 | Q419 | Q420 | Q423 | Q424 | Q427 |
|---|---|---|---|---|---|---|---|---|---|
| B | 0 | 0.7 | 11 | 0 | 0 | 0.6 | 10.5 | 0.7 | 0 |
| C | 0 | 0 | 11.5 | 11.5 | 11.5 | 0 | 11.5 | 0 | 0 |
| E | GND | GND | 11.5 | GND | 11.5 | GND | 11.5 | GND | GND |


CX143A
CX186
24 22 20 18 16 14
23 21 19 17 15 13
1 2 3 4 5 6 7 8 9 10 11 12
(Top view)
TA7120BP
1 2 3 4 5 6 7
TC4001BP
TC4011 BP
14 13 12 11 10 9 8
1 2 3 4 5 6 7
(Top view)
TC4049BP
16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8
(Top view)
2SA772
E C B
10E2
1S1555
1T22AM
RD6.2E
cathode
anode
2SA1027R
E C B
2SC1061
B C E
2SC1345
2SC1475
E C B
2SC1364
E C B
2SC1761
B C E

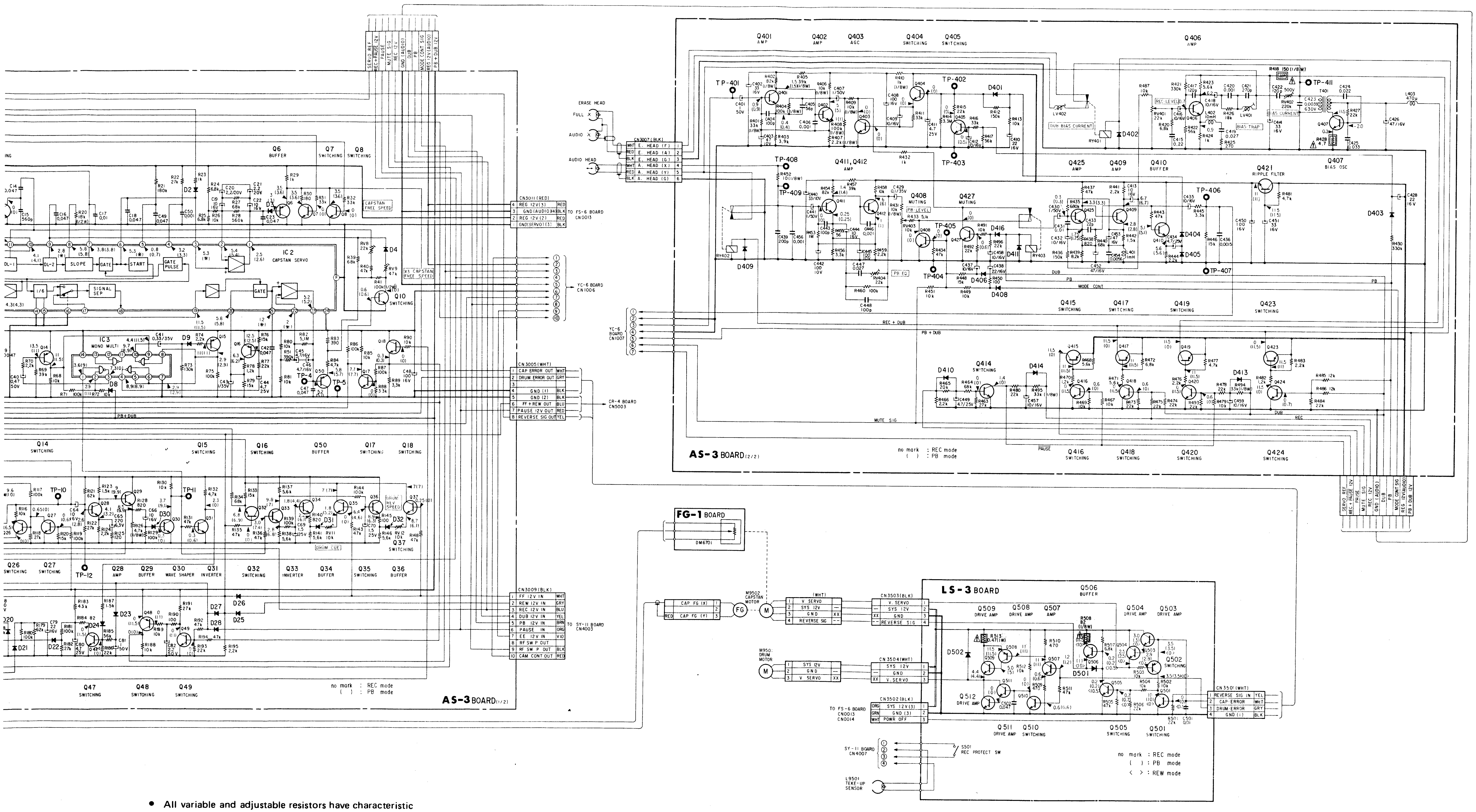
## AS-3 (SERVO, AUDIO RECORD/PLAYBACK PROCESS), LS-3 (CAPSTAN & DRUM MOTOR DRIVE), SJ-1 (SERVO CONTROL DURING VARIABLE PLAYBACK MODE) AND FG-1 (CAPSTAN FLY FG) BOARDS SCHEMATIC DIAGRAM

– Ref. No. AS-3 BOARD: 3000 Series LS-3 BOARD: 3500 Series SJ-1 BOARD: 4700 Series FG-1 BOARD: 6700 Series CHASSIS: 9500 Series –


TC4011BP
TC4001P
TC4049P
SJ-1 BOARD
no mark : REC mode
( ) : PB mode
< > : PB + PAUSE mode
CN4702 (WHT)
P-G IN
JD SIG IN
CAP-M-FG IN
Ⓐ OUT
Ⓑ OUT
REVERSE SIG OUT
FRAME RV OUT
FRAME SPEED OUT A
FRAME SPEED OUT B
CN4701 (BLK)
REG 12V IN
GND
PB 12V IN
EJECT 12V IN
PAUSE IN
CAP M CONT IN
SLOW VR IN
FRAME SW IN
SLOW SW IN
TO SY-11 BOARD CN4004
IC704 (1/3) NAND GATE
Q701 SWITCHING
IC707 (1/6) INVERTER
IC701 (1/4) NAND GATE
Q702 SWITCHING
IC706 (1/3) INVERTER
IC703 (1/2) NAND GATE
Q703 INVERTER
Q704 SWITCHING
IC705 (1/3) NOR GATE
Q705 SWITCHING
IC702 (1/4) NAND GATE
CN3010 (RED)
P-G OUT
JD SIG OUT
CAP-M-FG OUT
Ⓐ IN
Ⓑ IN
REVERSE SIG IN
FRAME RV IN
FRAME SPEED IN
CN3001 (BLK)
PG COIL
PG COIL (X)
PG COIL (Y)
CN3002 (WHT)
CAP FG (X)
CAP FG (Y)
CTL
CN-5 BOARD TP-1
CTL HEAD
CN3006 (WHT)
CTL HEAD (Y)
CTL HEAD (X)
CN3012 (RED)
REC 12V
FG IN
GND
CN3008 (BLK)
THREAD IN
X3 SIG IN
DRUM CONT IN
APS SW OUT
TO SY-11 BOARD CN4002
RV7 100k
NOISE POSITION
PG-A DELAY
LOCK PHASE
PG-B DELAY
FRAME SPEED
Q1 BUFFER
Q2 SWITCHING
Q3 SWITCHING
Q4 SWITCHING
Q5 SWITCHING
TP-1
TP-2
TP-3
TP-6
TP-7
TP-8
TP-9
TP-10
TP-12
TP-13
IC1 DRUM SERVO
PG DET
F.F
DL-B
DL-A
LOCK PHASE
GATE PULSE
GATE
1/2
DL
M.M
SLOPE
START
SINGLE SEP
X3 NOISE POSITION
TRACKING CENTER
Q9 SWITCHING
DRUM FREE SPEED
DL-1
DL-2
SIGNAL SEP
IC3 MONO MULTI
PB+DUB
Q11 SWITCHING
Q12 SWITCHING
Q13 SWITCHING
Q14 SWITCHING
IC4 CTL AMP
Q21 SWITCHING
Q22 SWITCHING
Q23 SWITCHING
Q24 CTL REC AMP
Q25 SWITCHING
Q26 SWITCHING
Q27 SWITCHING
Q28 AMP
Q29 BUFFER
Q38 WAVE SHAPER
Q39 WAVE SHAPER
Q40 INVERTER
IC5 NAND GATE
Q41 SWITCHING
Q42 SWITCHING
Q43 SWITCHING
Q44 SWITCHING
Q45 SWITCHING
Q46 SWITCHING
Q47 SWITCHING
Q48 SWITCHING

**NOTES:**

- All resistors are in ohms, ¼ W unless otherwise noted. kΩ = 1000 Ω; MΩ = 1000kΩ
- All capacitors are in μF unless otherwise noted. p : μμF 50WV or less are not indicated except for electrolytics.


AS-3 BOARD(1/2)
AS-3 BOARD(2/2)
FG-1 BOARD
LS-3 BOARD
IC2 CAPSTAN SERVO
IC3 MONO MULTI
SLOPE
START
GATE PULSE
GATE
SIGNAL SEP
CAPSTAN FREE SPEED
DRUM HLV SPEED
DRUM CUE
PB EQ
PB LEVEL
REC LEVEL
DUB BIAS CURRENT
BIAS CURRENT
BIAS TRAP
ERASE HEAD
FULL
AUDIO
AUDIO HEAD
CN3007 (BLK)
E. HEAD (F)
E. HEAD (A)
E. HEAD (G)
A. HEAD (X)
A. HEAD (Y)
A. HEAD (G)
CN3011 (RED)
REG 12V(3)
GND(AUDIO)(4)
REG 12V (2)
GND(SERVO)(3)
TO FS-6 BOARD CN0013
YC-6 BOARD CN1006
YC-6 BOARD CN1007
CN3005 (WHT)
CAP ERROR OUT
DRUM ERROR OUT
GND (1)
GND (2)
FF+REW OUT
PAUSE 12V OUT
REVERSE SIG OUT
CR-4 BOARD CN5003
CN3009 (BLK)
FF 12V IN
REW 12V IN
REC 12V IN
DUB 12V IN
PB 12V IN
PAUSE IN
EE 12V IN
RF SW P OUT
RF SW P OUT
CAM CONT OUT
TO SY-11 BOARD CN4003
SERVO REF
REC+PAUSE 12V
MUTE SIG
REC 12V
GND (AUDIO)
DUB
PB
MODE CONT SIG
REG 12V(AUDIO)
PB+DUB 12V
Q401 AMP
Q402 AMP
Q403 AGC
Q404 SWITCHING
Q405 SWITCHING
Q406 AMP
Q407 BIAS OSC
Q408 MUTING
Q409 AMP
Q410 BUFFER
Q411, Q412 AMP
Q413
Q414 SWITCHING
Q415 SWITCHING
Q416 SWITCHING
Q417 SWITCHING
Q418 SWITCHING
Q419 SWITCHING
Q420 SWITCHING
Q421 RIPPLE FILTER
Q423 SWITCHING
Q424 SWITCHING
Q425 AMP
Q427 MUTING
Q6 BUFFER
Q7 SWITCHING
Q8 SWITCHING
Q10 SWITCHING
Q14 SWITCHING
Q15 SWITCHING
Q16 SWITCHING
Q50 BUFFER
Q17 SWITCHING
Q18 SWITCHING
Q26 SWITCHING
Q27 SWITCHING
Q28 AMP
Q29 BUFFER
Q30 WAVE SHAPER
Q31 INVERTER
Q32 SWITCHING
Q33 INVERTER
Q34 BUFFER
Q35 SWITCHING
Q36 BUFFER
Q37
Q47 SWITCHING
Q48 SWITCHING
Q49 SWITCHING
TP-4
TP-5
TP-10
TP-11
TP-12
TP-401
TP-402
TP-403
TP-404
TP-405
TP-406
TP-407
TP-408
TP-409
TP-411
MUTE SIG
REC + DUB
PB + DUB
MODE CONT
PAUSE
no mark : REC mode
( ) : PB mode
CAP FG (X)
CAP FG (Y)
DM6701
M9502 CAPSTAN MOTOR
M9501 DRUM MOTOR
FG
CN3503 (BLK)
V. SERVO
SYS 12V
GND
REVERSE SIG
CN3504 (WHT)
CN3502 (BLK)
SYS 12V (3)
GND (3)
POWR OFF
TO FS-6 BOARD CN0013 CN0014
CN3501 (WHT)
REVERSE SIG IN
CAP ERROR
DRUM ERROR
GND (1)
Q501
Q502 SWITCHING
Q503 DRIVE AMP
Q504 DRIVE AMP
Q505 SWITCHING
Q506 BUFFER
Q507 AMP
Q508 DRIVE AMP
Q509 DRIVE AMP
Q510 SWITCHING
Q511 DRIVE AMP
Q512 DRIVE AMP
D501
D502
SY-11 BOARD CN4007
S501 REC PROTECT SW
L9501 TEKE-UP SENSOR
no mark : REC mode
( ) : PB mode
< > : REW mode

¼ W unless otherwise noted.
Ω

= unless otherwise noted.
re not indicated except for

- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ⏛ : nonflammable resistor.
- The red lines show the main voltages.
- All voltages are dc measured with a VOM (20kΩ/V).

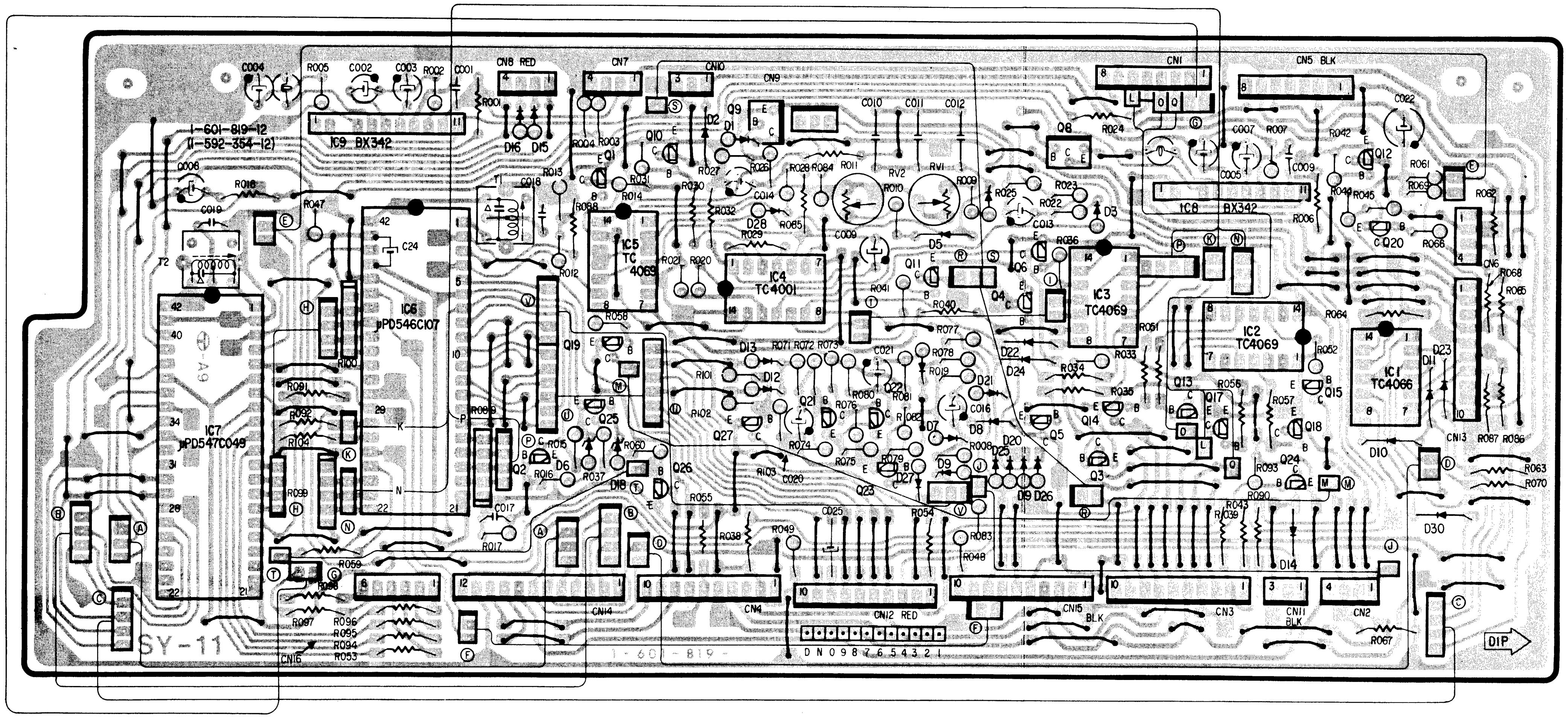
**The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.**

## SY-11 (FUNCTION KEY), SY-10 (LOGIC CONTROL), PL-2 (SOLENOID DRIVE), RM-1/RM-2 (REMOTE CONTROL – transmit section –), IR-1 (REMOTE CONTROL – receive section –), CN-5 (RELAY) AND CN-6 (SLACK SENSOR) PRINTED WIRING BOARDS

– Ref. No. SY-11 BOARD: 4000 Series SY-10 BOARD: 4500 Series PL-2 BOARD: 4600 Series RM-1, RM-2 BOARDS: 4800 Series IR-1 BOARD: 4900 Series CN-5, CN-6 BOARDS: 6200 Series CHASSIS: 9500 Series –

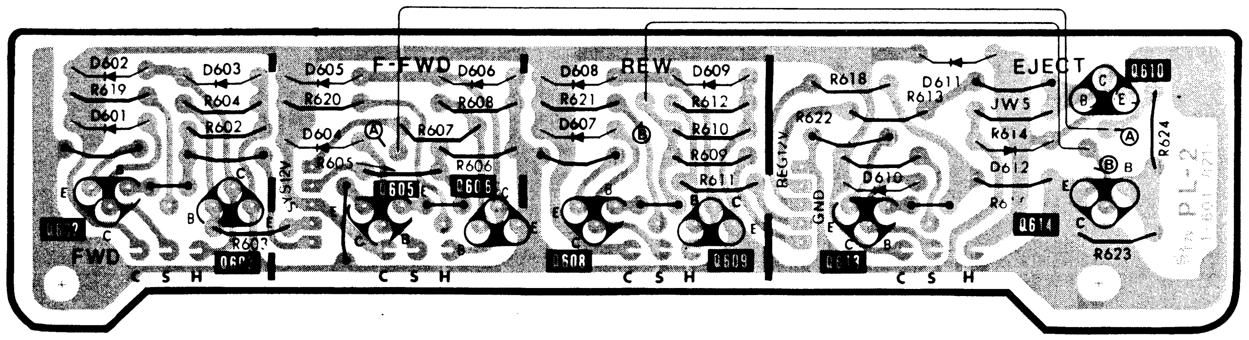
### SY-11 BOARD

| | |
|---|---|
| Q, IC | IC7, IC9, IC6, 2, 25, 1, IC5, 19, 10, 26, 9, IC4, 27, 21, 22, 23, 11, 4, 6, 5, 8, IC3, 3, 14, 13, IC8, 17, IC2, 18, 24, 15, 12, 20, IC1 |
| D | 16, 15, 6, 18, 2, 1, 12, 28, 13, 27, 29, 5, 7, 9, 4, 8, 22, 24, 21, 25, 20, 19, 26, 3, 14, 10, 11, 30, 23 |
| ADJ | RV2, RV1 |

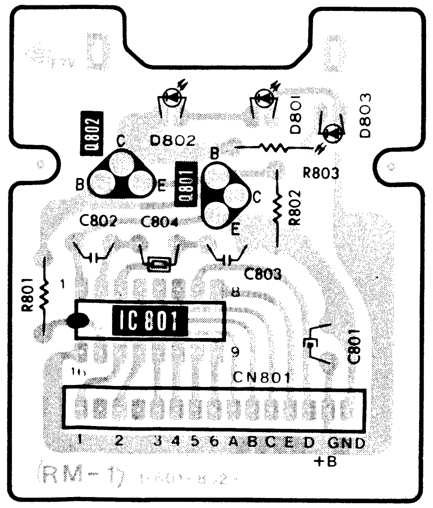

SY-11
1-601-819-12
(1-592-354-12)
IC9 BX342
IC6 μPD546C107
IC7 μPD547C049
IC5 TC4069
IC4 TC4001
IC3 TC4069
IC2 TC4069
IC1 TC4066
IC8 BX342
RV1
RV2
CN1
CN2
CN3
CN4
CN5 BLK
CN6
CN7
CN8 RED
CN9
CN10
CN11 BLK
CN12 RED
CN13
CN14
CN15 BLK
CN16
DN0987654321
DIP

### PL-2 BOARD

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Q | 602 | 603 | 605 | 606 | 608 | 609 | 613 | | 610<br>614 |
| D | 602<br>601 | 603 | 605<br>604 | 606 | 608<br>607 | 609 | 610 | 611 | 612 |

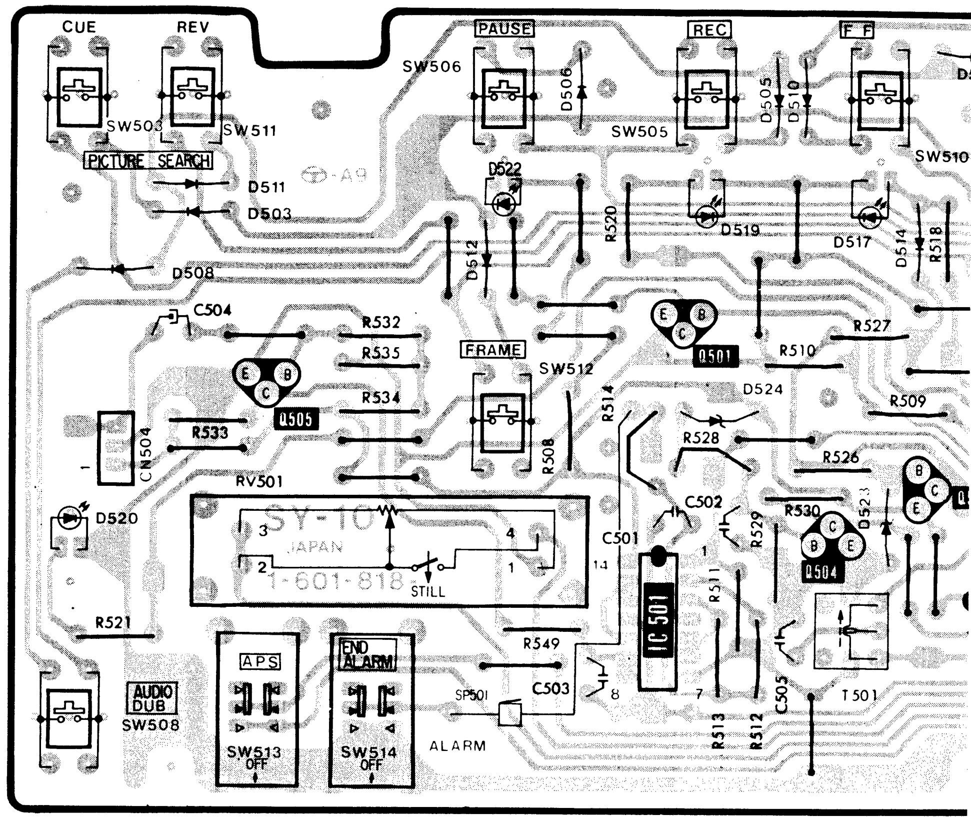

FWD
F-FWD
REW
EJECT
PL-2
S H
C S H
GND
BEGIN

### RM-1 BOARD

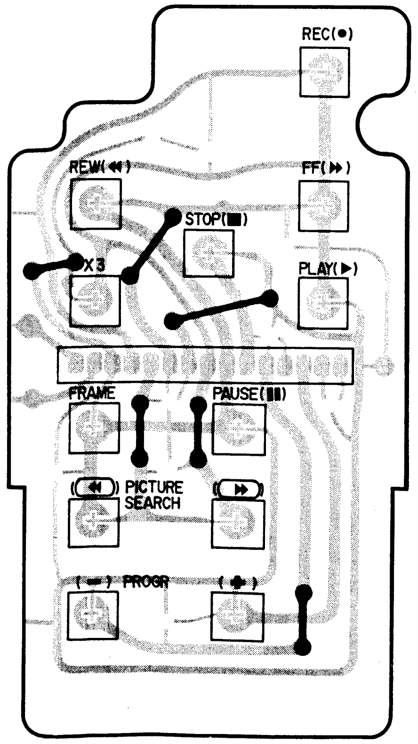

IC801
Q801
Q802
D801
D802
D803
CN801
1 2 3 4 5 6 A B C E D GND
+B
RM-1

### SY-10 BOARD

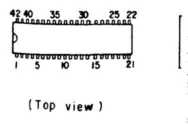
| | |
|---|---|
| Q, IC | 505, IC501, 501, 504, 503 |
| D | 520, 508, 511, 503, 512, 522, 506, 519, 524, 505, 510, 517, 523 |
| ADJ | T501 |


CUE
REV
PAUSE
REC
F F
SW503
SW511
SW506
SW505
SW510
PICTURE SEARCH
FRAME
SW512
SY-10
JAPAN
1-601-818
STILL
AUDIO DUB
SW508
APS
SW513 OFF
END ALARM
SW514 OFF
ALARM
IC501
T501
RV501

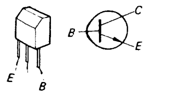
### RM-2 BOARD

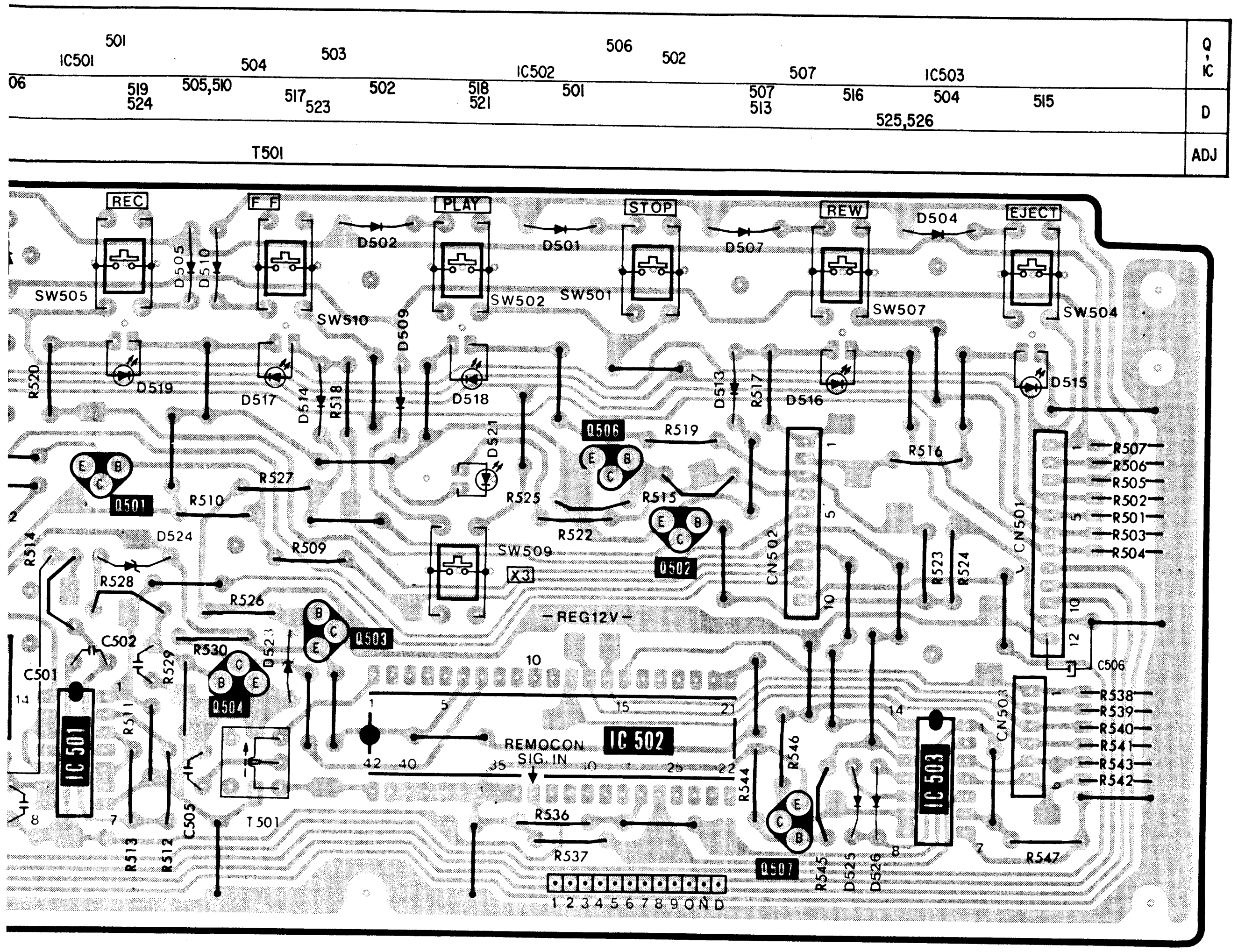

REC(●)
REW(◀◀)
FF(▶▶)
STOP(■)
X3
PLAY(▶)
FRAME
PAUSE(❚❚)
(◀◀) PICTURE SEARCH (▶▶)
(–) PROGR (+)

μPD546C107
μPD547C049
μPD547C060

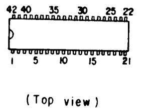

42 40 35 30 25 22
1 5 10 15 21
(Top view)

2SC2315

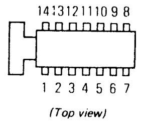



Q IC
D
ADJ
IC501
501
504
503
506
502
IC502
507
IC503
519
524
505,510
517
523
502
518
521
501
507
513
516
504
525,526
515
T501
REC
F F
PLAY
STOP
REW
EJECT
SW505
SW510
SW502
SW501
SW507
SW504
SW509
D502
D501
D507
D504
D505
D510
D509
D519
D517
D514
D518
D521
D513
D516
D515
D524
D523
D525
D526
R520
R518
R517
R519
R516
R527
R510
R525
R522
R515
R509
R514
R528
R526
R529
R530
R511
R513
R512
R536
R537
R544
R546
R545
R547
R523
R524
R507
R506
R505
R502
R501
R503
R504
R538
R539
R540
R541
R543
R542
Q501
Q502
Q503
Q504
Q506
Q507
CN502
CN501
CN503
C501
C502
C505
C506
IC 501
IC 502
IC 503
X3
-REG12V-
REMOCON SIG. IN
1 2 3 4 5 6 7 8 9 0 N D

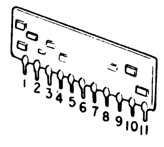
**µPD546C107**
**µPD547C049**
**µPD547C060**


42 40 35 30 25 22
1 5 10 15 21
(Top view)

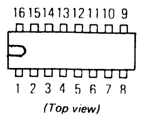
**µPD4069C**


14 13 12 11 10 9 8
1 2 3 4 5 6 7
(Top view)

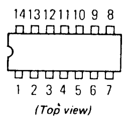
**BX342**


1 2 3 4 5 6 7 8 9 10 11

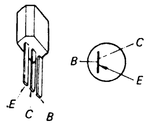
**M50112P**


16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8
(Top view)

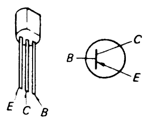
**TC4001BP**
**TC4011BP**
**TC4066BP**
**TC4081BP**


14 13 12 11 10 9 8
1 2 3 4 5 6 7
(Top view)

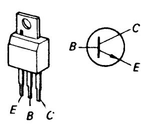
**2SA1027R**



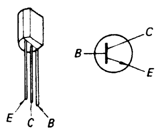
**2SA772**



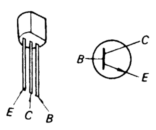
**2SC1124**



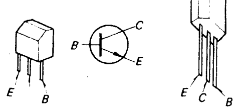
**2SC1364**



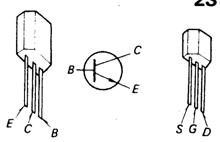
**2SC1474**



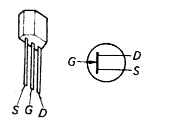
**2SC2315**



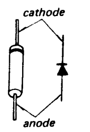
**2SC403C**



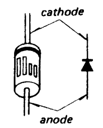
**2SK23A**



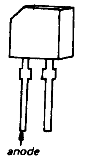
**10E2**
**1S1555**
**RD11E-B**


cathode
anode

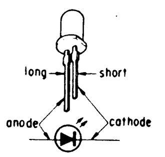
**EQB01–08**


cathode
anode

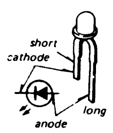
**PH302A**



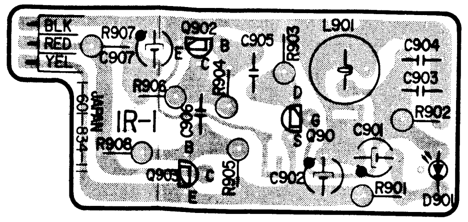
**SE303A**


long
short
anode
cathode

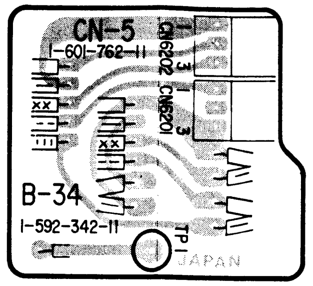
**TLR123**


short
cathode
long
anode

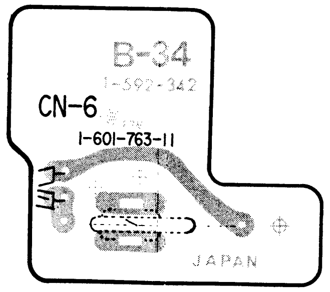
IR-1 BOARD


BLK
RED
YEL
R907
Q902
C907
C905
R903
L901
C904
C903
R906
R904
IR-1
R902
R908
C906
Q901
C901
C903
R905
C902
R901
D901
1-601-761-11

CN-5 BOARD


CN-5
1-601-762-11
CN903
CN902
B-34
1-592-342-11
TP
JAPAN

CN-6 BOARD


B-34
1-592-342
CN-6
1-601-763-11
JAPAN

SY-11 BOARD

IC 6

| PIN No. / MODE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CUE | 7.2 | 0 | 0 | 0 | 9.6 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 9.3 | 0 | 0 | 0 | 10 | 10 | 10 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| REV | 7.2 | 0 | 0 | 0 | 9.6 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 9.3 | 0.3 | 0 | 0 | 10 | 0 | 10 | 10 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PB + PAUSE | 7.2 | 0 | 0 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.5 | 0 | 0 | 0 | 10 | 10 | 10 | 0 | 0 | 0 | 0 | 10 | 10 | 0 |

| | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CUE | 0 | 0 | – | 0.7 | 0.8 | 0 | 0.4 | 0.4 | 3.8 | 0 | 10 | 0.8 | GND | 7.1 |
| REV | 0 | 0 | – | 0.7 | 0.4 | 0 | 0.4 | 0.8 | 3.8 | 0 | 10 | 0.8 | GND | 7.1 |
| PB + PAUSE | 0 | 0 | – | 0.7 | 0.4 | 0 | 0.4 | 0.4 | 3.9 | 0 | 10 | 2.7 | GND | 7.1 |

IC 7

| PIN No. / MODE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CUE | 7.1 | GND | 0 | 0 | 0.7 | 10 | 0 | 9.5 | 9.5 | 9.5 | 9.5 | 0.8 | 0 | 0.4 | 0.4 | 3.2 | – | – | – | 10 | 10 | – | – | – | – | 0.5 | 0.5 | 0.5 |
| REV | 7.1 | GND | 0 | 0 | 0.7 | 10 | 0 | 9.5 | 9.5 | 9.5 | 9.5 | 0.4 | 0 | 0.4 | 0.8 | 3.3 | – | – | – | 10 | 10 | – | – | – | – | 0.5 | 0.5 | 0.5 |
| PB + PAUSE | 7.1 | GND | 0 | 0 | 0.7 | 10 | 0 | 9.5 | 9.5 | 9.5 | 9.5 | 0.4 | 0 | 0.4 | 0.4 | 2.8 | – | – | – | 10 | 10 | – | – | – | – | 0.5 | 0.5 | 0.5 |

| | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CUE | 0.5 | 8.2 | – | – | 0.5 | 0 | 0.4 | 0.4 | 10 | 0 | 0 | 0 | GND | 7.1 |
| REV | 0.5 | 8.2 | – | – | 0 | 0 | 0.4 | 0.9 | 10 | 0 | 0 | 0 | GND | 7.1 |
| PB + PAUSE | 0.5 | 8.2 | – | – | 0 | 0 | 0.4 | 0.4 | 10 | 0 | 0 | 0 | GND | 7.1 |

SY-10 BOARD

IC 2

| MODE / PIN No. | REW | F.F | STOP | X3 | FWD | FRAME | PAUSE | REV | CUE | PROGR – | PROGR + |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 0 | 10 | 10 | 0 | 0 | 10 | 10 | 0 | 10 | 0 | 0 |
| 13 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 10 | 10 | 10 |
| 14 | 0 | 10 | 0 | 0 | 10 | 10 | 0 | 10 | 0 | 10 | 0 |
| 15 | 0 | 0 | 0 | 10 | 0 | 10 | 10 | 10 | 10 | 10 | 0 |
| 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| 27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 |

| PAUSE mode | | | |
|---|---|---|---|
| | | PB | REC |
| Q1 | B | 0.6 | 0.6 |
| | C | 0 | 0 |
| IC 3 | 13 | 10 | 10 |
| | 12 | 0 | 11.5 |
| | 11 | 0 | 11 |
| | 1 | | 11 |
| | 2 | | 0 |
| | 3 | | 0 |
| | 4 | | 11 |
| | 5 | | 0 |
| | 6 | | 11 |

| X3 mode | | |
|---|---|---|
| Q6 | B | 0.6 |
| | C | 0 |

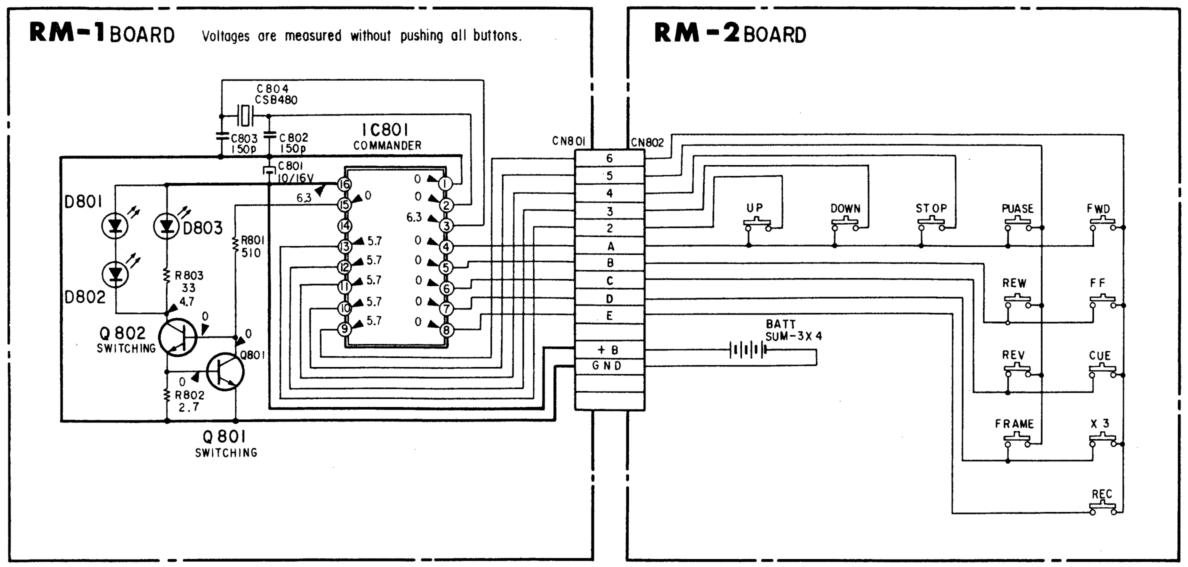
| | | F.FWD mode | REW mode |
|---|---|---|---|
| Q3 | B | 0 | 0 |
| | C | 7.8 | 7.8 |

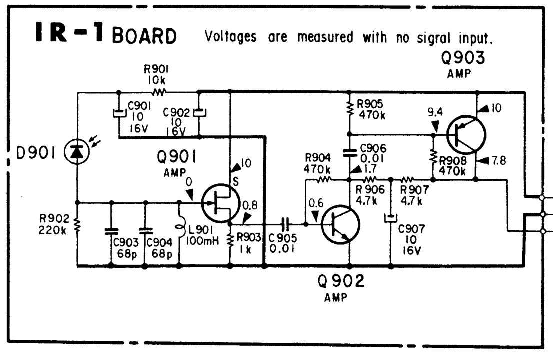
RM-1 BOARD

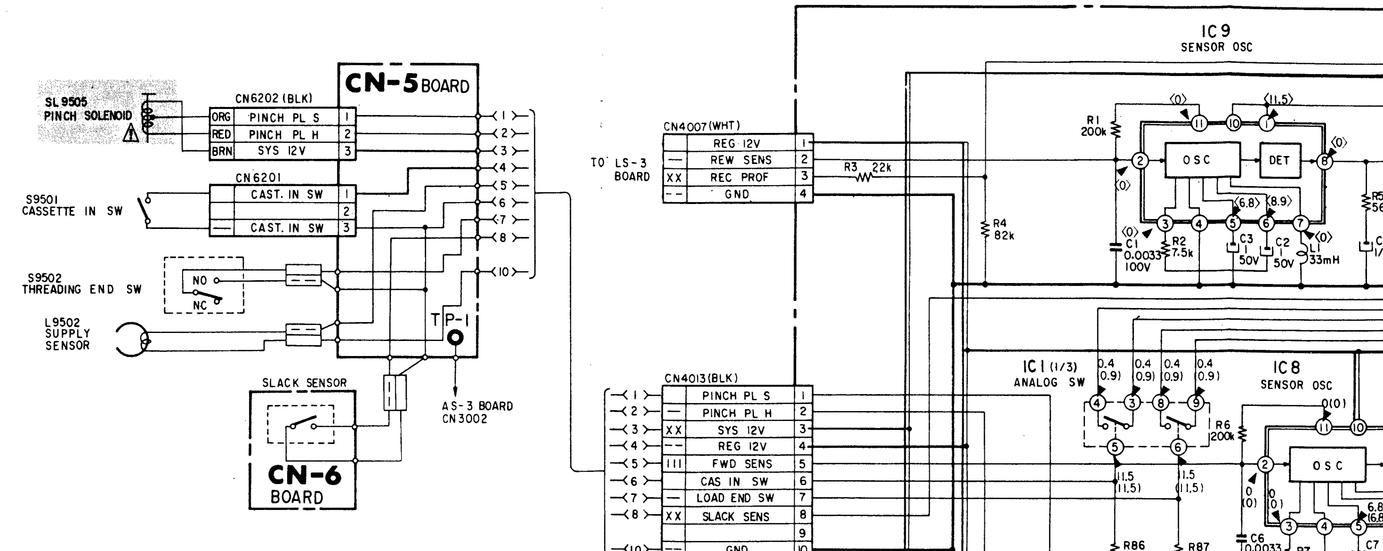
| | | MODE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | REC (●) | REW (◀◀) | FF (▶▶) | STOP (■) | X3 | PLAY (▶) | FRAME | PAUSE (❚❚) | REV (◀◀) | CUE (▶▶) | PROGRAM-MING (–) | PROGRAM-MING (+) |
| IC 801 1PIN GND | 2 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| | 4 | 5.1 | 5.1 | 5.1 | 5.2 | 5.1 | 5.2 | 5.1 | 5.1 | 5.1 | 5.1 | 5.2 | 5.2 |
| | 5 | 5.1 | 5.2 | 5.2 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 |
| | 6 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.2 | 5.2 | 5.1 | 5.1 |
| | 7 | 5.1 | 5.1 | 5.1 | 5.1 | 5.2 | 5.1 | 5.2 | 5.2 | 5.1 | 5.1 | 5.1 | 5.1 |
| | 8 | 5.2 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 |
| | 9 | 5.2 | 5.7 | 5.2 | 5.6 | 5.2 | 5.2 | 5.7 | 5.7 | 5.6 | 5.2 | 5.6 | 5.6 |
| | 10 | 5.7 | 5.2 | 5.6 | 5.6 | 5.6 | 5.6 | 5.2 | 5.2 | 5.2 | 5.6 | 5.6 | 5.6 |
| | 11 | 5.7 | 5.6 | 5.6 | 5.2 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 |
| | 12 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.2 | 5.6 |
| | 13 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 |
| | 15 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| | 16 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 |
| Q 802 | B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 |
| | E | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

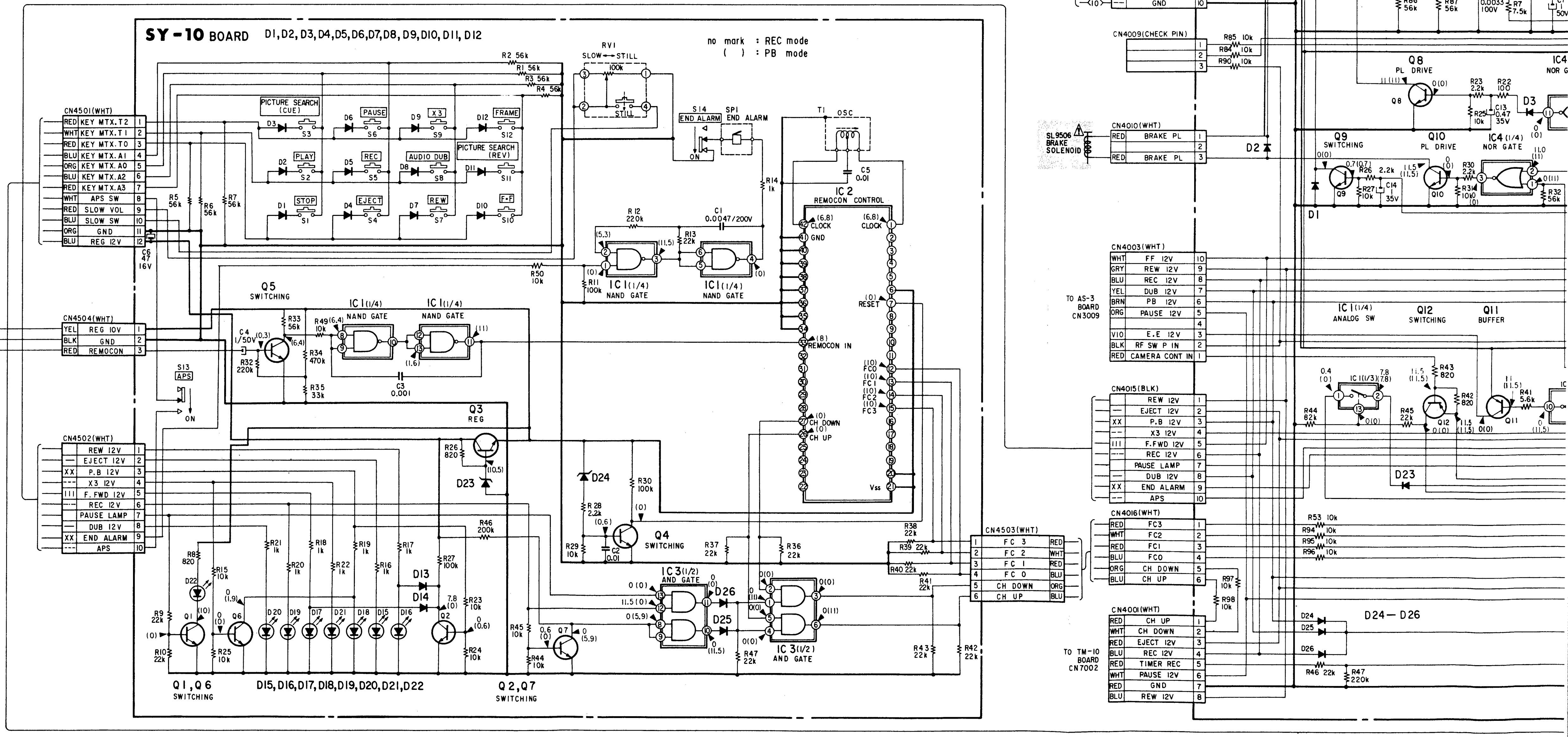
## SY-11 (FUNCTION KEY), SY-10 (LOGIC CONTROL), PL-2 (SOLENOID DRIVE), RM-1/RM-2 (REMOTE CONTROL – transmit section –), IR-1 (REMOTE CONTROL – receive section–), CN-5 (RELAY) AND CN-6 (SLACK SENSOR) BOARDS SCHEMATIC DIAGRAM

– Ref. No. SY-11 BOARD: 4000 Series SY-10 BOARD: 4500 Series PL-2 BOARD: 4600 Series RM-1, RM-2 BOARDS: 4800 Series IR-1 BOARD: 4900 Series CN-5, CN-6 BOARDS: 6200 Series CHASSIS: 9500 Series –


RM-1 BOARD
Voltages are measured without pushing all buttons.
RM-2 BOARD
C804 CSB480
C803 150p
C802 150p
C801 10/16V
IC801 COMMANDER
D801
D802
D803
R801 510
R803 33
R802 2.7
Q802 SWITCHING
Q801 SWITCHING
CN801
CN802
UP
DOWN
STOP
PUASE
FWD
REW
FF
REV
CUE
FRAME
X 3
REC
BATT SUM-3 X 4
+B
GND


IR-1 BOARD
Voltages are measured with no signal input.
D901
Q901 AMP
Q902 AMP
Q903 AMP
R901 10k
R902 220k
C901 10 16V
C902 10 16V
C903 68p
C904 68p
L901 100mH
R903 1k
C905 0.01
R904 470k
R905 470k
R906 4.7k
R907 4.7k
R908 470k
C906 0.01
C907 10 16V

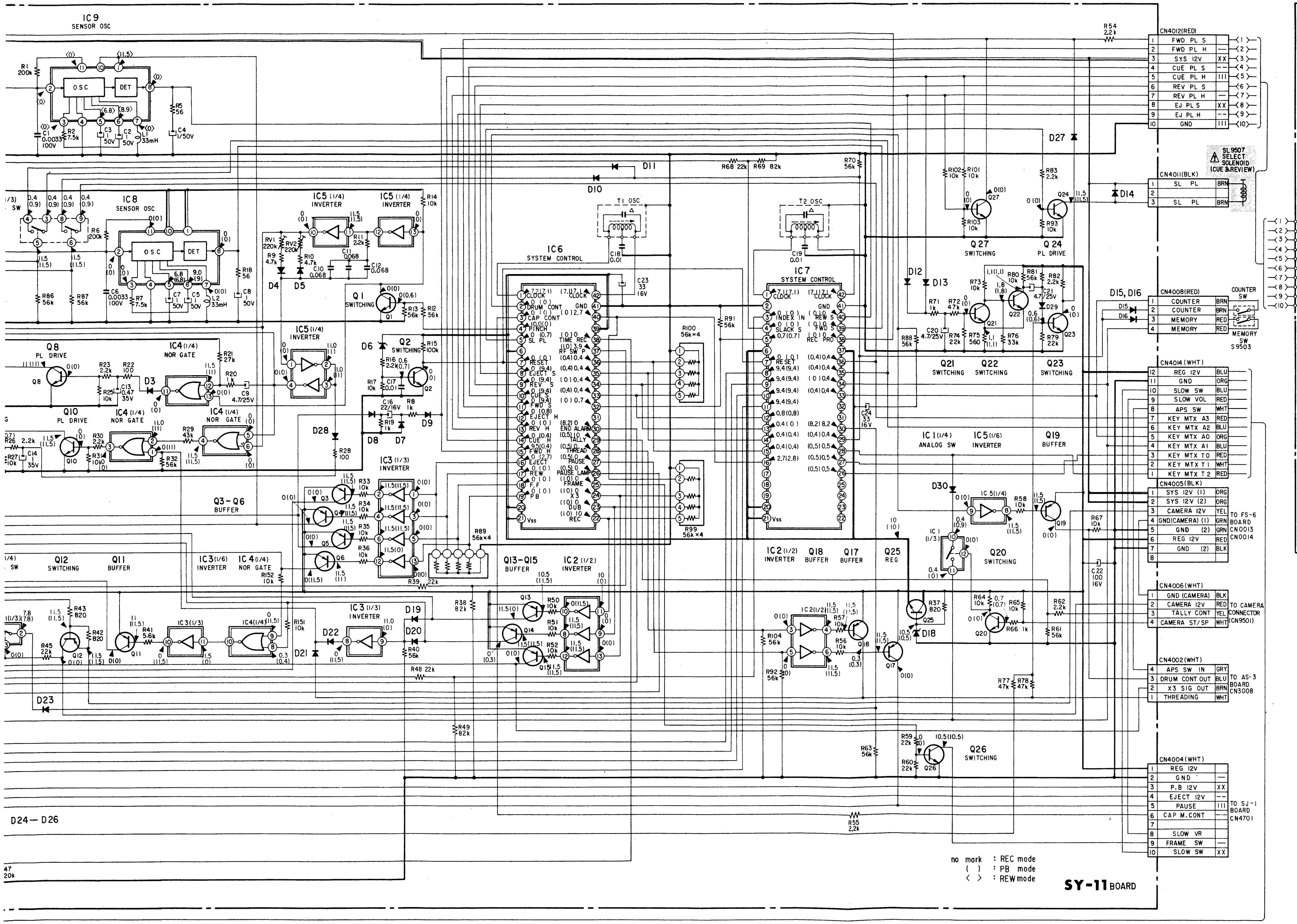
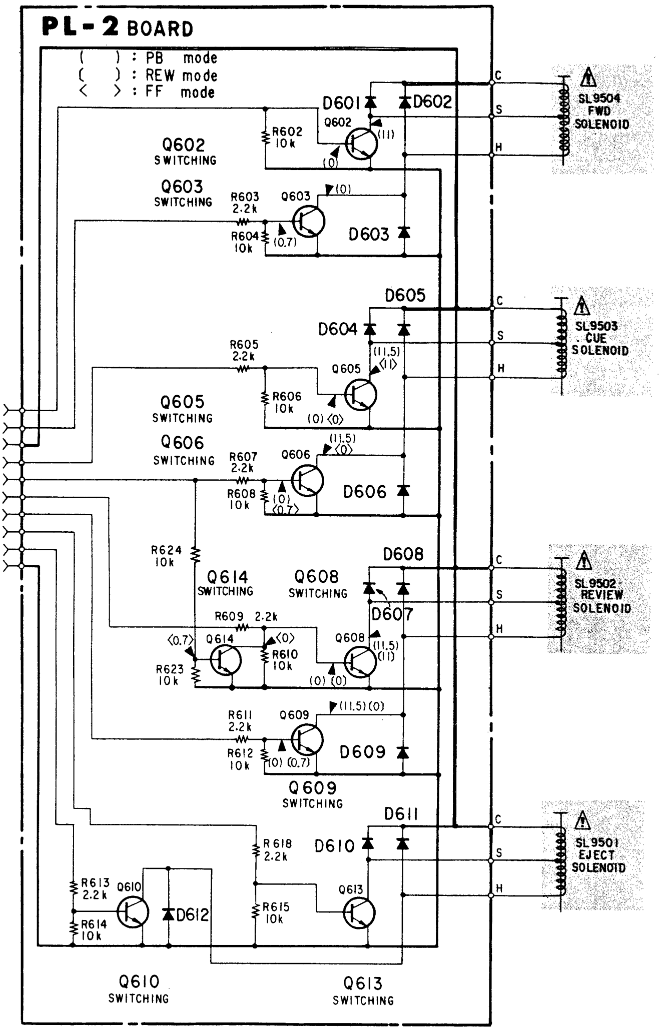

CN-5 BOARD
CN-6 BOARD
SL9505 PINCH SOLENOID
CN6202 (BLK)
PINCH PL S
PINCH PL H
SYS 12V
CN6201
CAST. IN SW
S9501 CASSETTE IN SW
S9502 THREADING END SW
L9502 SUPPLY SENSOR
SLACK SENSOR
TP-1
AS-3 BOARD CN3002
CN4007 (WHT)
REG 12V
REW SENS
REC PROF
GND
TO LS-3 BOARD
CN4013 (BLK)
FWD SENS
CAS IN SW
LOAD END SW
SLACK SENS
IC9 SENSOR OSC
IC8 SENSOR OSC
IC1 (1/3) ANALOG SW
OSC
DET


SY-10 BOARD D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12
no mark : REC mode
( ) : PB mode
CN4501 (WHT)
KEY MTX. T2
KEY MTX. T1
KEY MTX. T0
KEY MTX. A1
KEY MTX. A0
KEY MTX. A2
KEY MTX. A3
APS SW
SLOW VOL
SLOW SW
GND
REG 12V
PICTURE SEARCH (CUE)
PAUSE
X3
FRAME
PLAY
REC
AUDIO DUB
PICTURE SEARCH (REV)
STOP
EJECT
REW
F·F
RV1 SLOW ↔ STILL
S14 END ALARM
SP1 END ALARM
T1 OSC
IC2 REMOCON CONTROL
CLOCK
RESET
REMOCON IN
CH DOWN
CH UP
IC1 (1/4) NAND GATE
CN4504 (WHT)
REG 10V
GND
REMOCON
Q5 SWITCHING
Q3 REG
Q4 SWITCHING
S13 APS
CN4502 (WHT)
REW 12V
EJECT 12V
P.B 12V
X3 12V
F. FWD 12V
REC 12V
PAUSE LAMP
DUB 12V
END ALARM
APS
IC3 (1/2) AND GATE
Q1, Q6 SWITCHING
D15, D16, D17, D18, D19, D20, D21, D22
Q2, Q7 SWITCHING
CN4503 (WHT)
FC 3
FC 2
FC 1
FC 0
CH DOWN
CH UP
CN4009 (CHECK PIN)
Q8 PL DRIVE
Q9 SWITCHING
Q10 PL DRIVE
IC4 (1/4) NOR GATE
SL9506 BRAKE SOLENOID
CN4010 (WHT)
BRAKE PL
CN4003 (WHT)
FF 12V
REW 12V
REC 12V
DUB 12V
PB 12V
PAUSE 12V
E.E 12V
RF SW P IN
CAMERA CONT IN
TO AS-3 BOARD CN3009
IC1 (1/4) ANALOG SW
Q12 SWITCHING
Q11 BUFFER
CN4015 (BLK)
CN4016 (WHT)
FC3
FC2
FC1
FCO
CN4001 (WHT)
TIMER REC
PAUSE 12V
GND
TO TM-10 BOARD CN7002
D24 – D26

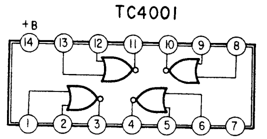
NOTES:

- All resistors are in ohms, ¼ W unless otherwise noted. kΩ = 1000Ω; MΩ = 1000kΩ
- All capacitors are in μF unless otherwise noted. p : μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- The red lines show the main voltages.
- All voltages are dc measured with a VOM (20kΩ/V).

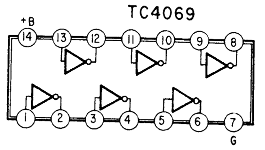
## )S SCHEMATIC DIAGRAM



IC9 SENSOR OSC
IC8 SENSOR OSC
IC5 (1/4) INVERTER
IC6 SYSTEM CONTROL
IC7 SYSTEM CONTROL
T1 OSC
T2 OSC
Q1 SWITCHING
Q2 SWITCHING
Q8 PL DRIVE
Q10 PL DRIVE
IC4 (1/4) NOR GATE
Q3-Q6 BUFFER
IC3 (1/3) INVERTER
Q12 SWITCHING
Q11 BUFFER
IC3 (1/6) INVERTER
IC4 (1/4) NOR GATE
Q13-Q15 BUFFER
IC2 (1/2) INVERTER
IC2 (1/2) INVERTER
Q18 BUFFER
Q17 BUFFER
Q25 REG
Q27 SWITCHING
Q24 PL DRIVE
Q21 SWITCHING
Q22 SWITCHING
Q23 SWITCHING
IC1 (1/4) ANALOG SW
IC5 (1/6) INVERTER
Q19 BUFFER
Q20 SWITCHING
Q26 SWITCHING
D24-D26
CN4012 (RED)
FWD PL S
FWD PL H
SYS 12V
CUE PL S
CUE PL H
REV PL S
REV PL H
EJ PL S
EJ PL H
GND
CN4011 (BLK)
SL PL
SL PL
SL9507 SELECT SOLENOID (CUE & REVIEW)
CN4008 (RED)
COUNTER
COUNTER
MEMORY
MEMORY
COUNTER SW
MEMORY SW S9503
CN4014 (WHT)
REG 12V
GND
SLOW SW
SLOW VOL
APS SW
KEY MTX A3
KEY MTX A2
KEY MTX A0
KEY MTX A1
KEY MTX T0
KEY MTX T1
KEY MTX T2
CN4005 (BLK)
SYS 12V (1)
SYS 12V (2)
CAMERA 12V
GND (CAMERA) (1)
GND (2)
REG 12V
GND (2)
TO FS-6 BOARD CN0013 CN0014
CN4006 (WHT)
GND (CAMERA)
CAMERA 12V
TALLY CONT
CAMERA ST/SP
TO CAMERA CONNECTOR (CN9501)
CN4002 (WHT)
APS SW IN
DRUM CONT OUT
X3 SIG OUT
THREADING
TO AS-3 BOARD CN3008
CN4004 (WHT)
REG 12V
GND
P.B 12V
EJECT 12V
PAUSE
CAP M.CONT
SLOW VR
FRAME SW
SLOW SW
TO SJ-1 BOARD CN4701
no mark : REC mode
( ) : PB mode
< > : REW mode
SY-11 BOARD
PL-2 BOARD
( ) : PB mode
( ) : REW mode
< > : FF mode
Q602 SWITCHING
Q603 SWITCHING
SL9504 FWD SOLENOID
Q605 SWITCHING
Q606 SWITCHING
SL9503 CUE SOLENOID
Q614 SWITCHING
Q608 SWITCHING
SL9502 REVIEW SOLENOID
Q609 SWITCHING
SL9501 EJECT SOLENOID
Q610 SWITCHING
Q613 SWITCHING

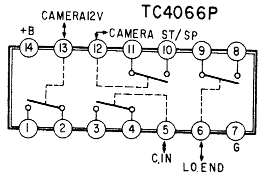
TC4001



TC4069



TC4066P

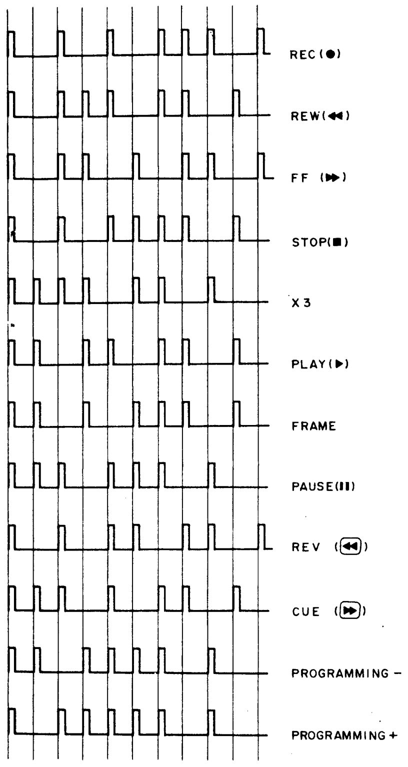

CAMERA12V
CAMERA ST/SP
C.IN
LO.END

**The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.**

## CH-3 (AUTO TUNING), CI-1 (CHANNEL INDICATOR), PC-1 (REG), TU-11 (TUNER) AND IF-10 (VIF, SIF, AFT) PRINTED WIRING BOARDS

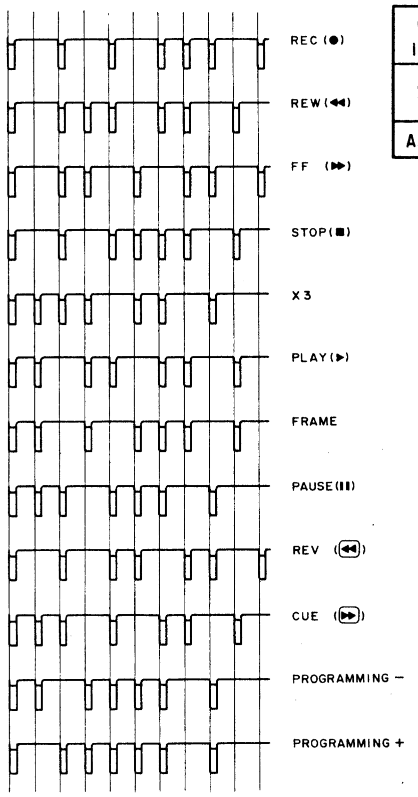
– Ref. No. CH-3, CI-1 BOARDS: 6000 Series PC-1 BOARD: 6500 Series TU-11 BOARD: 8100 Series IF-10 BOARD: 8500 Series CHASSIS: 9500 Series –

RM-1 BOARD (2/2) IC801-⑮



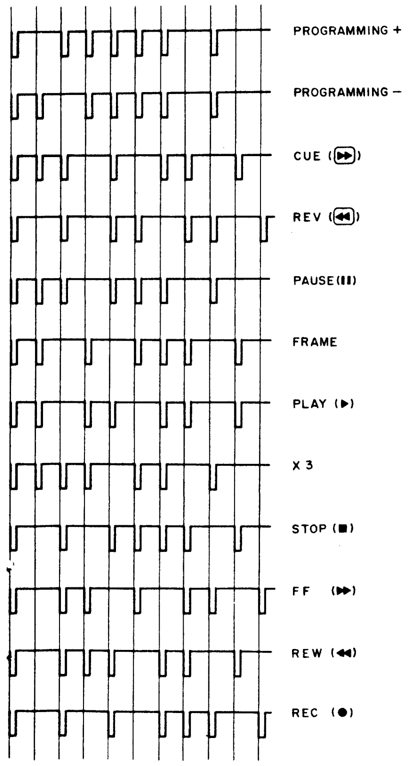
H: 2ms/div V: 5Vp-p

RM-1 BOARD (1/2) Q802-Ⓒ



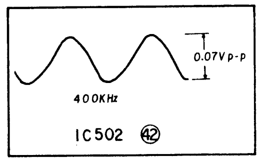
H: 2ms/div V: 2.2Vp-p

SY-10 BOARD IC-2 ㉝

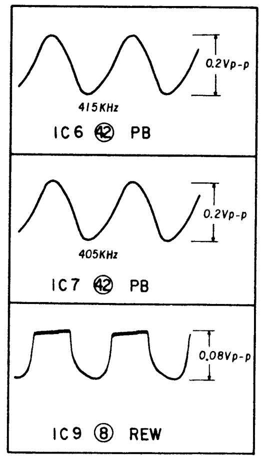


H: 2ms/div V: 9.5Vp-p

SY-10 BOARD

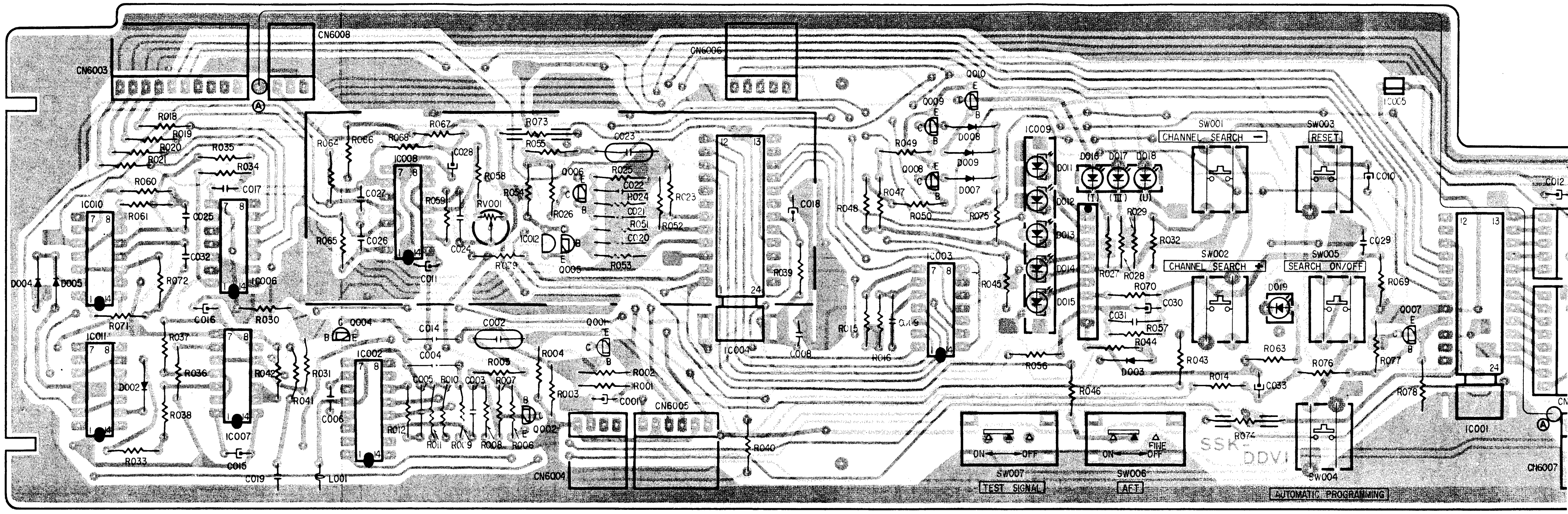


SY-11 BOARD

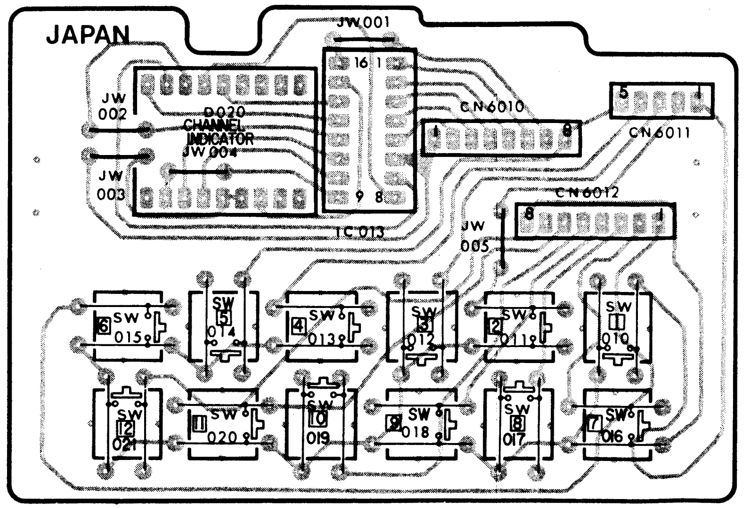


CH-3 BOARD

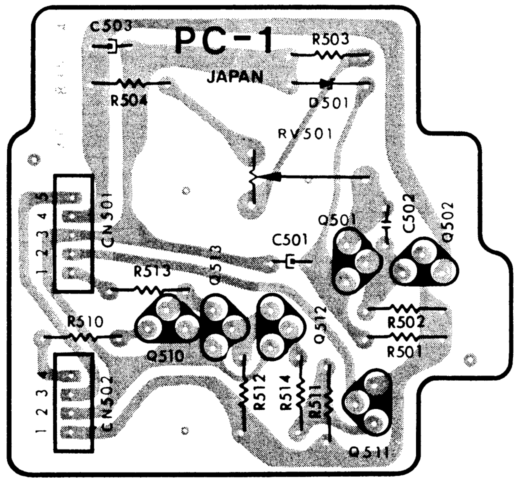
| | |
|---|---|
| Q<br>IC | IC010 IC011 IC006 IC007 004 IC002 IC008 006 005 001 002 IC012 IC004 009 008 010 IC003 IC009 007 IC005 IC001 |
| D | 004 005 008 009 007 011 ≀ 015 016 017 018 003 019 |
| ADJ | RV001 |

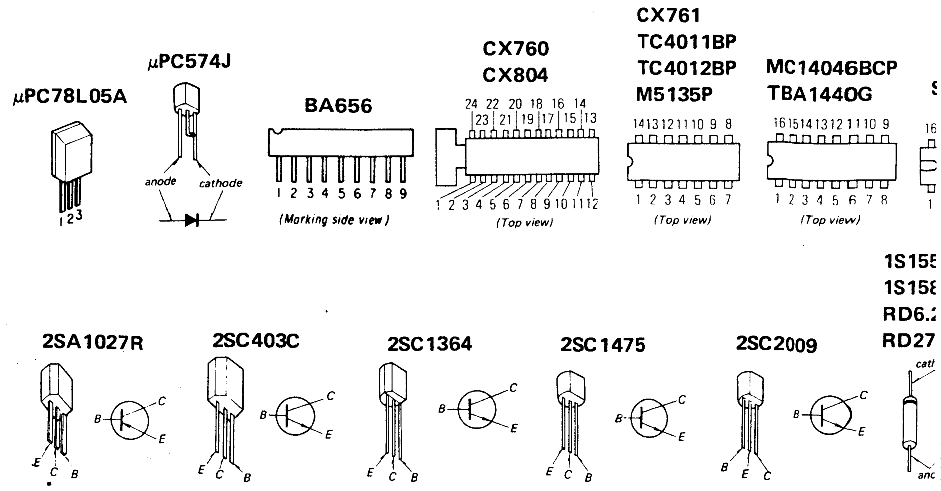

CN6003
CN6008
CN6006
CN6005
CN6004
CN6007
IC010
IC011
IC006
IC007
IC008
IC002
IC004
IC003
IC009
IC005
IC001
RV001
SW001 CHANNEL SEARCH –
SW002 CHANNEL SEARCH +
SW003 RESET
SW005 SEARCH ON/OFF
SW007 TEST SIGNAL
SW006 AFT
SW004 AUTOMATIC PROGRAMMING
ON OFF
FINE

CI-1 BOARD

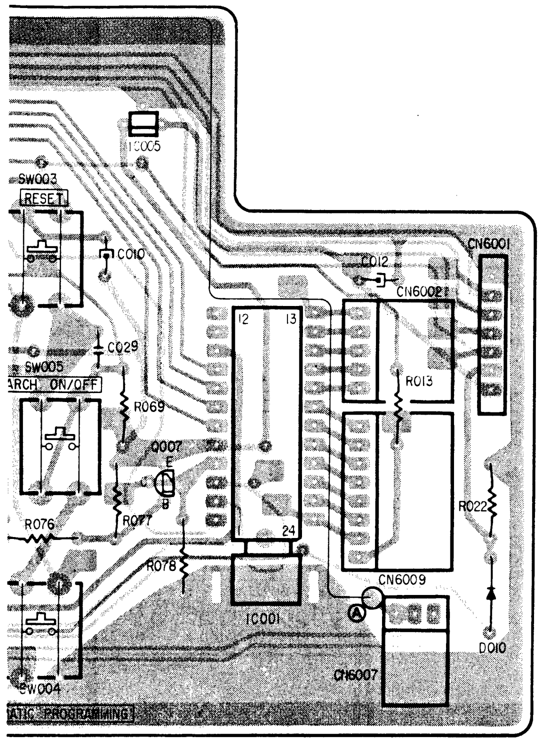

JAPAN
JW001
JW002
JW003
JW004
JW005
D020 CHANNEL INDICATOR
IC013
CN6010
CN6011
CN6012
SW 015
SW 014
SW 013
SW 012
SW 011
SW 010
SW 021
SW 020
SW 019
SW 018
SW 017
SW 016

PC-1 BOARD


PC-1
JAPAN
C503
R503
R504
D501
RV501
CN501
C501
Q501
C502
Q502
R513
Q513
R510
Q510
Q512
R502
R501
R512
R514
R511
Q511
CN502

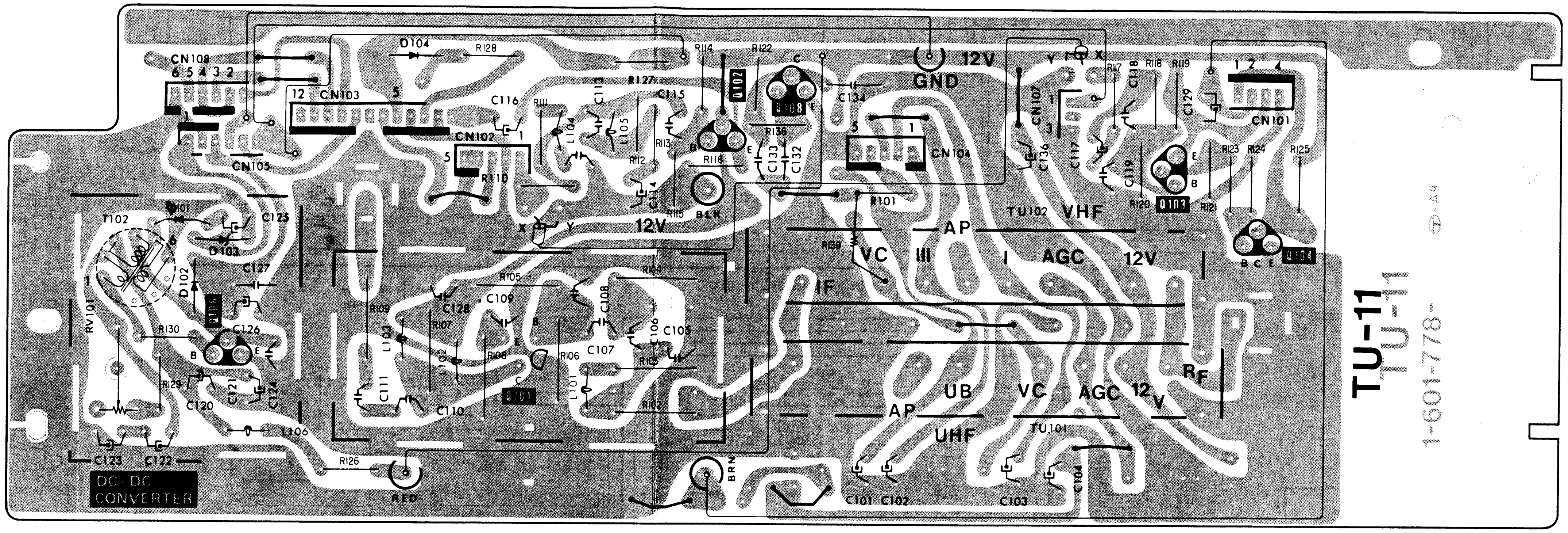

μPC78L05A
μPC574J
anode cathode
BA656
(Marking side view)
CX760
CX804
(Top view)
CX761
TC4011BP
TC4012BP
M5135P
(Top view)
MC14046BCP
TBA1440G
(Top view)
1S15
1S15
RD6.
RD27
2SA1027R
2SC403C
2SC1364
2SC1475
2SC2009
E C B
B C E

| | |
|---|---|
| 007<br>IC005 IC001 | Q<br>IC |
| 010 | D |
| | ADJ |


IC005
SW003
RESET
C010
C012
CN6002
CN6001
C029
SW005
ARCH ON/OFF
R069
Q007
R013
R076
R077
R078
R022
24
IC001
CN6009
CN6007
D010
SW004
ATIC PROGRAMMING

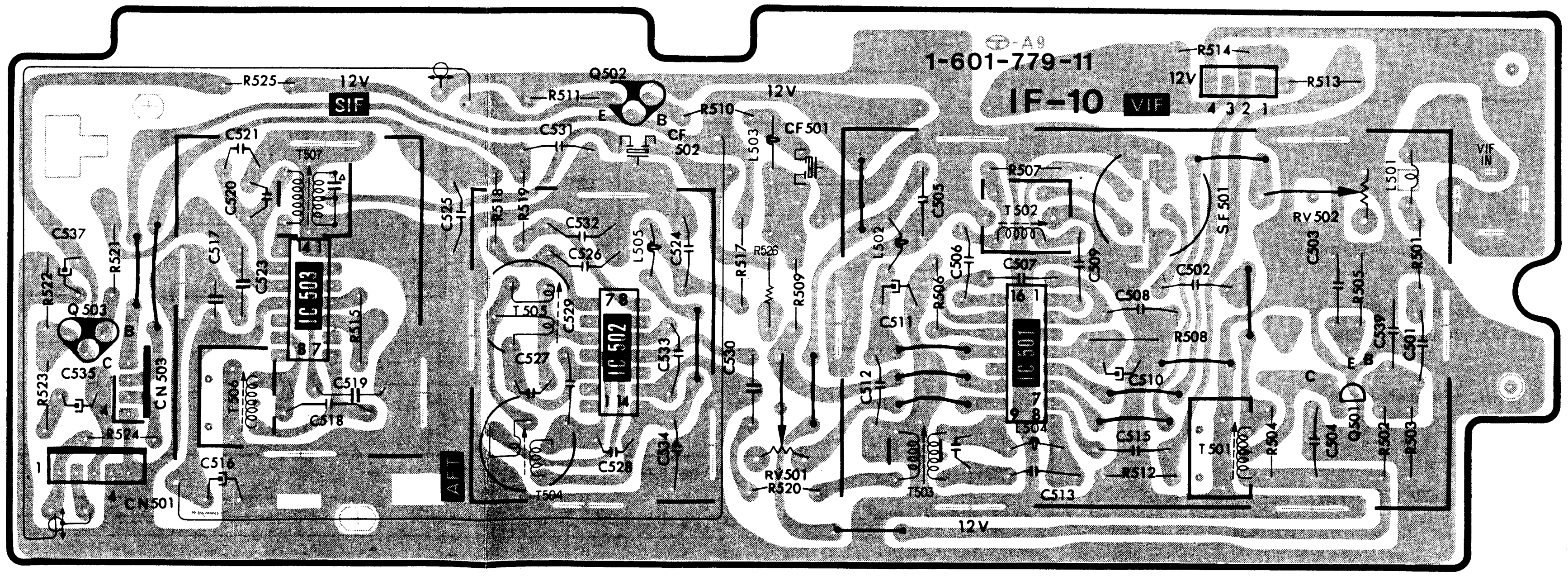
TU-11 BOARD

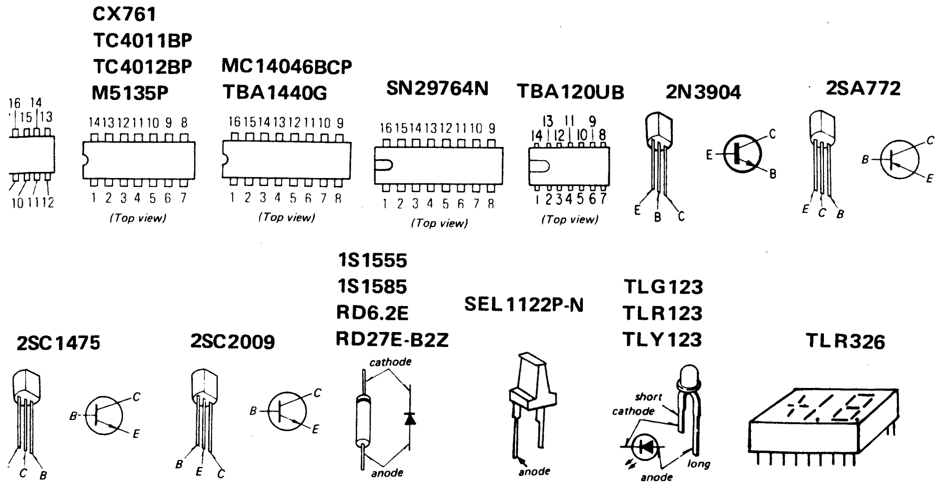
| | | |
|---|---|---|
| IC<br>Q | 106 101 102 108 103 104 | IC<br>Q |
| D | 101 102 103 104 | D |
| ADJ | RV101 | ADJ |


CN108
6 5 4 3 2
12 CN103 5
D104
R128
CN102
CN105
C116
R111
C113
L105
R127
C115
R114
R122
Q102
Q108
C134
12V
GND
CN107
R117
C118
R118
R119
C129
1 2 4
CN101
R112
R113
R116
R136
C133
C132
CN104
C136
C117
C119
Q103
R123
R124
R125
R110
C114
R115
BLK
12V
R101
R120
R121
TU102
VHF
T102
D101
C125
D103
R139
VC
III
AP
I
AGC
12V
Q104
B C E
C127
D102
Q106
R105
R104
IF
R109
C128
C109
C108
C106
C105
RV101
R130
C126
R107
L103
L102
R108
R106
C107
R103
R129
C121
C124
C111
C110
Q101
L101
R102
UB
VC
AGC
12V
RF
AP
UHF
TU101
C120
L106
C123
C122
R126
RED
BRN
C101
C102
C103
C104
DC DC CONVERTER
TU-11
1-601-778-

IF-10 BOARD

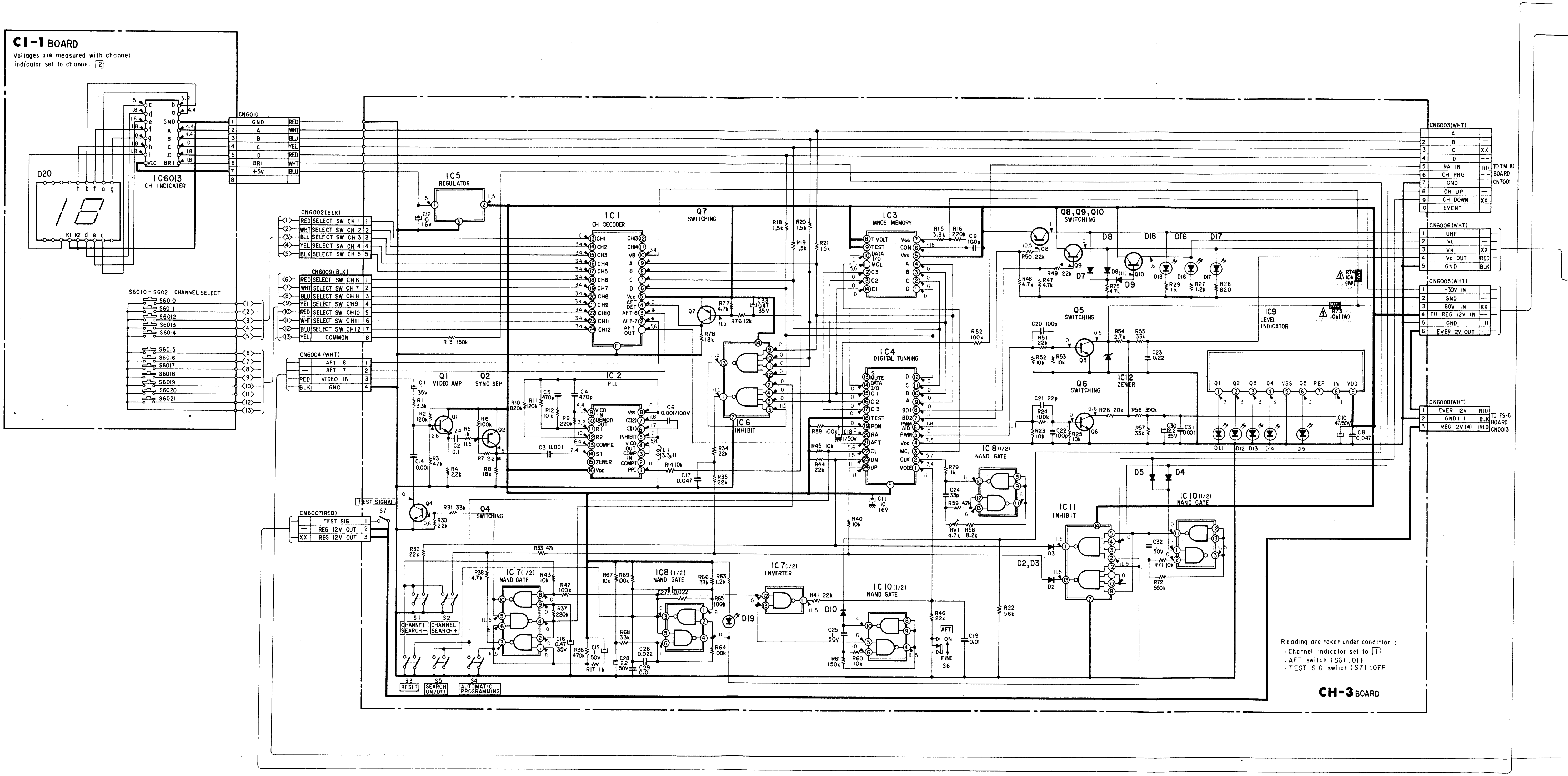
| | | |
|---|---|---|
| IC<br>Q | 503 IC503 502 IC502 IC501 501 | IC<br>Q |
| ADJ | RV501 RV502 | ADJ |


1-601-779-11
IF-10
VIF
R514
12V
R513
4 3 2 1
R525
12V
SIF
Q502
R511
E B
R510
12V
CF501
C531
CF502
L503
C521
T507
C520
C525
R518
R519
C532
C526
L505
C524
R507
T502
C505
SF501
RV502
L501
VIF IN
C537
R522
R521
C517
C523
IC503
R515
T503
C529
IC502
C533
C530
R517
R526
R509
L502
R506
C506
C507
C509
C511
IC501
C508
R508
C502
C503
R505
R501
C539
C501
Q503
C535
R523
CN503
T506
C519
C518
C527
C512
C510
B
C
E
Q501
R524
C516
CN501
AFT
T504
C528
C534
RV501
R520
T503
C515
C504
R512
T501
R504
R502
R503
C513
12V

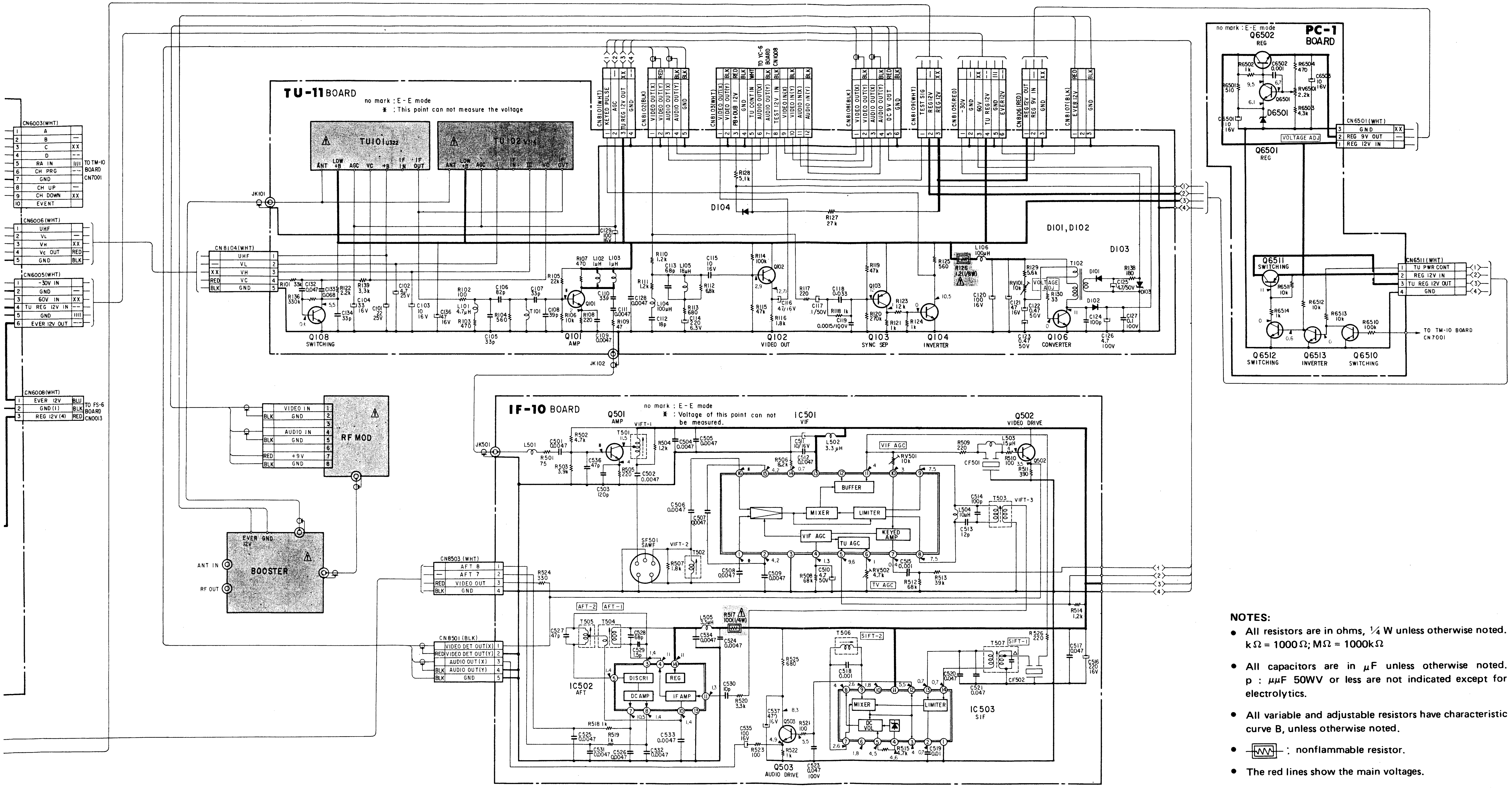

16 14
15 13
10 11 12
CX761
TC4011BP
TC4012BP
M5135P
14 13 12 11 10 9 8
1 2 3 4 5 6 7
(Top view)
MC14046BCP
TBA1440G
16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8
(Top view)
SN29764N
16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8
(Top view)
TBA120UB
13 11 9
14 12 10 8
1 2 3 4 5 6 7
(Top view)
2N3904
E B C
2SA772
E C B
2SC1475
C B
2SC2009
B E C
1S1555
1S1585
RD6.2E
RD27E-B2Z
cathode
anode
SEL1122P-N
anode
TLG123
TLR123
TLY123
short
cathode
long
anode
TLR326

## CH-3 (AUTO TUNING), CI-1 (CHANNEL INDICATOR), PC-1 (REG), TU-11 (TUNER) AND IF-10 (VIF, SIF, AFT) BOARDS SCHEMATIC DIAGRAM

– Ref. No. CH-3, CI-1 BOARDS: 6000 Series PC-1 BOARD: 6500 Series TU-11 BOARD: 8100 Series IF-10 BOARD: 8500 Series CHASSIS: 9500 Series –


CI-1 BOARD
Voltages are measured with channel indicator set to channel 12
D20
IC6013 CH INDICATER
CN6010
S6010 - S6021 CHANNEL SELECT
CN6002(BLK)
CN6009(BLK)
CN6004(WHT)
CN6007(RED)
TEST SIGNAL
S7
IC5 REGULATOR
IC1 CH DECODER
Q7 SWITCHING
IC2 PLL
Q1 VIDEO AMP
Q2 SYNC SEP
Q4 SWITCHING
IC6 INHIBIT
IC3 MNOS-MEMORY
IC4 DIGITAL TUNNING
Q8,Q9,Q10 SWITCHING
D8 D18 D16 D17
D7 D9
Q5 SWITCHING
Q6 SWITCHING
IC12 ZENER
IC9 LEVEL INDICATOR
IC8(1/2) NAND GATE
IC11 INHIBIT
IC10(1/2) NAND GATE
D5 D4
D2,D3
IC7(1/2) NAND GATE
IC8(1/2) NAND GATE
IC7(1/2) INVERTER
IC10(1/2) NAND GATE
D19
D10
AFT
FINE S6
S1 CHANNEL SEARCH−
S2 CHANNEL SEARCH+
S3 RESET
S5 SEARCH ON/OFF
S4 AUTOMATIC PROGRAMMING
CN6003(WHT) TO TM-10 BOARD CN7001
CN6006(WHT)
CN6005(WHT)
CN6008(WHT) TO FS-6 BOARD CN0013
CH-3 BOARD

Reading are taken under condition :
- Channel indicator set to 1
- AFT switch (S6) : OFF
- TEST SIG switch (S7) : OFF


TU-11 BOARD
no mark : E-E mode
✱ : This point can not measure the voltage
TU101 U322
TU102 V314
ANT LOW +B AGC VC +B IF IN IF OUT
CN6003 (WHT)
A
B
C
D
RA IN
CH PRG
GND
CH UP
CH DOWN
EVENT
TO TM-10 BOARD CN7001
CN6006 (WHT)
UHF
VL
VH
Vc OUT
GND
CN6005 (WHT)
-30V IN
GND
60V IN
TU REG 12V IN
GND
EVER 12V OUT
CN8104 (WHT)
CN8101 (WHT)
KEYED PULSE
AGC
TU REG 12V OUT
GND
CN8102 (BLK)
VIDEO OUT (X)
VIDEO OUT (Y)
AUDIO OUT (X)
AUDIO OUT (Y)
CN8103 (WHT)
TO VC-6 BOARD CN1008
CN8108 (BLK)
CN8109 (WHT)
TEST SIG
REG 12V
CN8105 (RED)
CN8106 (RED)
REG 9V IN
CN8107 (BLK)
EVER 12V
JK101
D104
R128 5.1k
R127 27k
D101, D102
D103
L106 100μH
R126 1.2(1/4W)
Q108 SWITCHING
Q101 AMP
Q102 VIDEO OUT
Q103 SYNC SEP
Q104 INVERTER
Q106 CONVERTER
T101
T102
VOLTAGE ADJ
JK102
CN6008 (WHT)
EVER 12V
GND (1)
REG 12V (4)
TO FS-6 BOARD CN0013
RF MOD
VIDEO IN
AUDIO IN
+9V
BOOSTER
EVER 12V
GND
ANT IN
RF OUT
IF-10 BOARD
no mark : E-E mode
✱ : Voltage of this point can not be measured.
Q501 AMP
IC501 VIF
Q502 VIDEO DRIVE
VIFT-1
VIFT-2
VIFT-3
VIF AGC
RV501 10k
BUFFER
MIXER
LIMITER
KEYED AMP
TU AGC
TV AGC
RV502 4.7k
SF501 SAWF
T502
T503
JK501
L501
L502 3.3μH
L503 15μH
L504 10μH
CF501
CN8503 (WHT)
AFT 8
AFT 7
VIDEO OUT
GND
CN8501 (BLK)
VIDEO DET OUT (X)
VIDEO DET OUT (Y)
AUDIO OUT (X)
AUDIO OUT (Y)
GND
AFT-2
AFT-1
T504
T505
IC502 AFT
DISCRI
REG
DC AMP
IF AMP
L505 3.3μH
R517 100 (1/4W)
Q503 AUDIO DRIVE
T506
SIFT-2
T507
SIFT-1
MIXER
LIMITER
DC VOL
IC503 SIF
CF502
R514 1.2k
R526 220
PC-1 BOARD
no mark : E-E mode
Q6502 REG
D6501
Q6501 REG
VOLTAGE ADJ
CN6501 (WHT)
GND
REG 9V OUT
REG 12V IN
Q6511 SWITCHING
CN6511 (WHT)
TU PWR CONT
REG 12V IN
TU REG 12V OUT
GND
Q6512 SWITCHING
Q6513 INVERTER
Q6510 SWITCHING
TO TM-10 BOARD CN7001

**NOTES:**

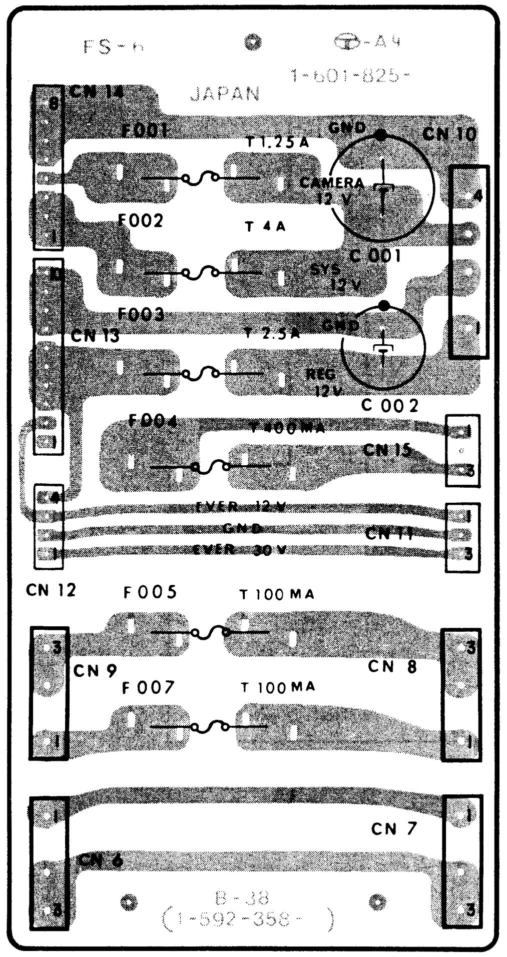
- All resistors are in ohms, ¼ W unless otherwise noted. kΩ = 1000Ω; MΩ = 1000kΩ
- All capacitors are in μF unless otherwise noted. p : μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ▭ : nonflammable resistor.
- The red lines show the main voltages.
- All voltages are dc measured with a VOM (20kΩ/V).

**The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.**

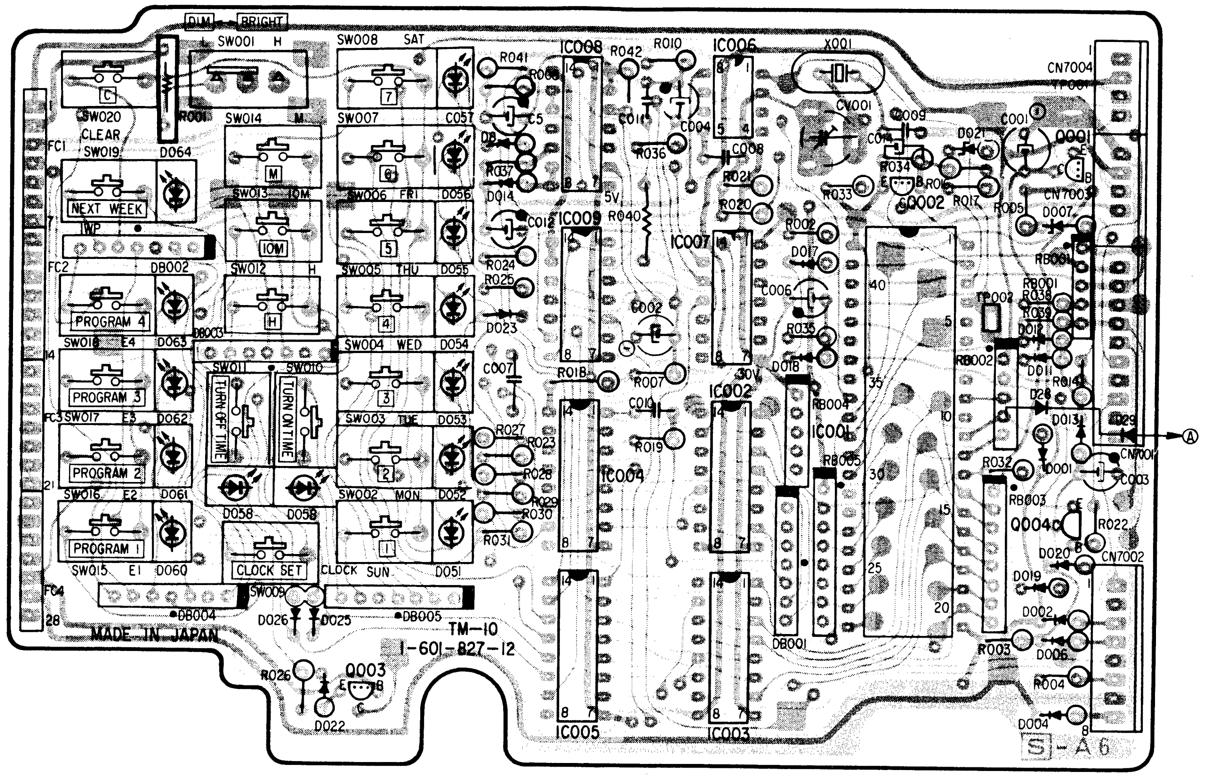
## FS-6 (FUSE), LF-11 (LINE FILTER), TM-10/TM-11/TM-12 (PROGRAM TIMER) AND SR-08 (SWITCHING MODE REG) PRINTED WIRING BOARDS

– Ref. No. FS-6, LF-11 BOARDS: 0001 Series TM-10, TM-11, TM-12 BOARDS: 7000 Series SR-08 (SWITCHING REGULATOR): 9000 Series CHASSIS: 9500 Series –

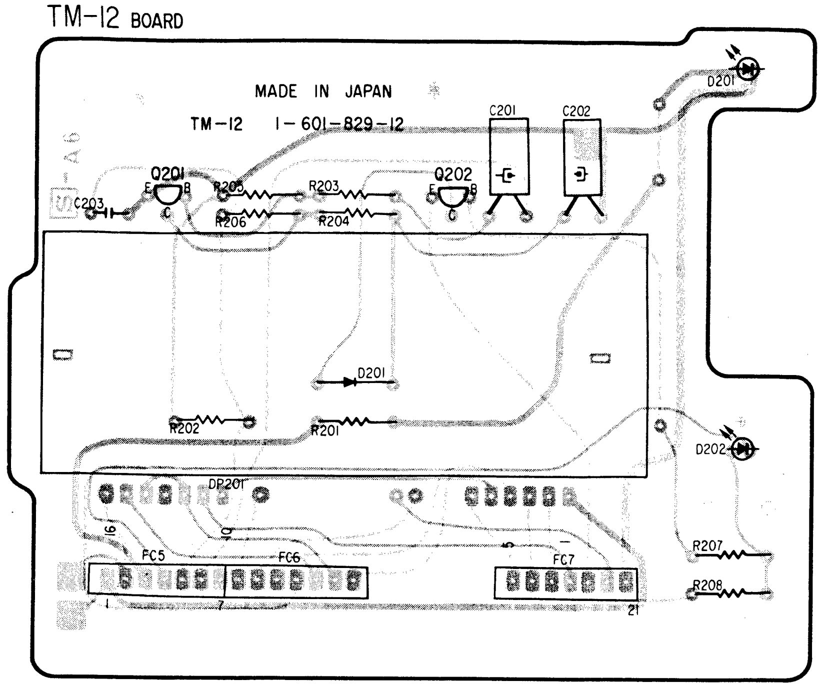
FS-6 BOARD


FS-6
JAPAN
1-601-825-
CN 14
F001
T 1.25 A
GND
CN 10
CAMERA 12 V
F002
T 4 A
C 001
SYS 12 V
F003
CN 13
T 2.5 A
GND
REG 12 V
C 002
F004
T 400 MA
CN 15
EVER 12 V
GND
EVER 30 V
CN 11
CN 12
F005
T 100 MA
CN 9
CN 8
F007
T 100 MA
CN 7
CN 6
B-38
(1-592-358-)

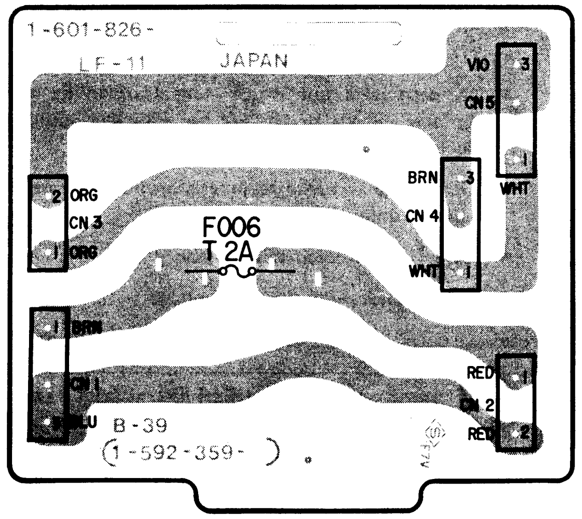
TM-10 BOARD


DIM
BRIGHT
SW001
SW008 SAT
IC008
IC006
X001
CN7004
SW020 CLEAR
SW019
NEXT WEEK
SW014 M
SW007
SW013 10M
SW006 FRI
IC009
IC007
PROGRAM 4
SW012 H
SW005 THU
SW018 E4
SW004 WED
PROGRAM 3
TURN OFF TIME
TURN ON TIME
SW017 E3
SW003 TUE
PROGRAM 2
SW016 E2
SW002 MON
PROGRAM 1
SW015 E1
CLOCK SET
CLOCK SUN
IC002
IC004
IC001
CN7002
CN7003
CN7001
MADE IN JAPAN
TM-10
1-601-827-12
Q003
IC005
IC003
S-A6

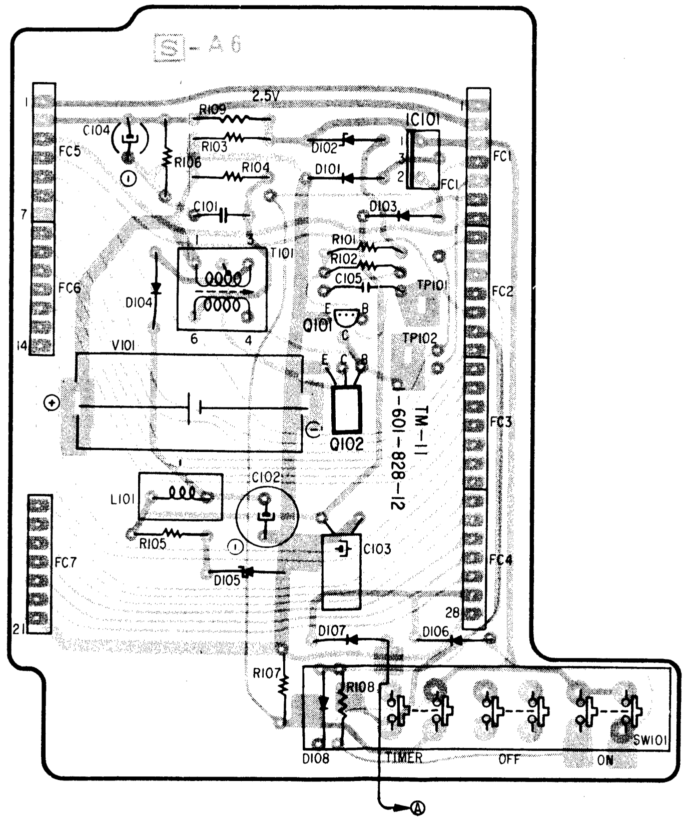
TM-12 BOARD


MADE IN JAPAN
TM-12 1-601-829-12
C201
C202
D201
Q201
Q202
R203
R205
R206
R204
C203
D201
R202
R201
D202
DP201
FC5
FC6
FC7
R207
R208
S-A6

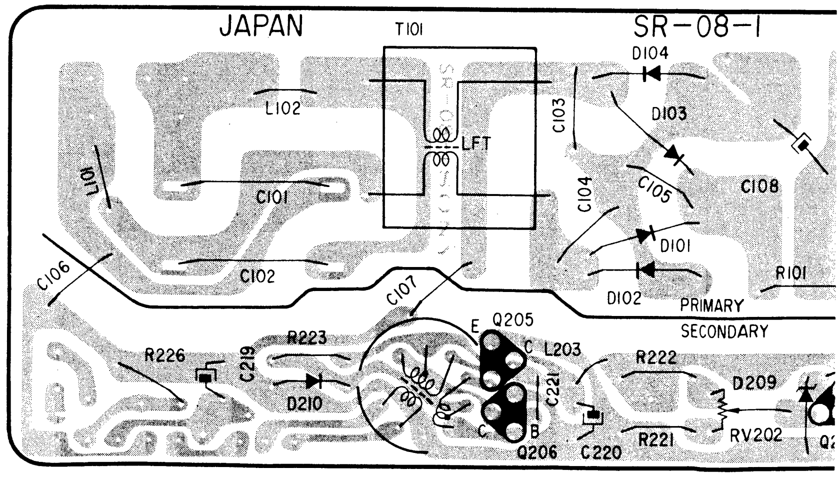
LF-11 BOARD

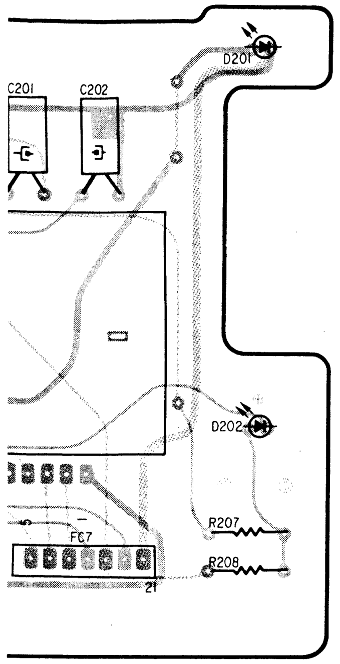

1-601-826-
LF-11
JAPAN
VIO
CN 5
ORG
CN 3
ORG
BRN
CN 4
WHT
F006
T 2A
BRN
CN 1
RED
CN 2
BLU
RED
B-39
(1-592-359-)

TM-II BOARD

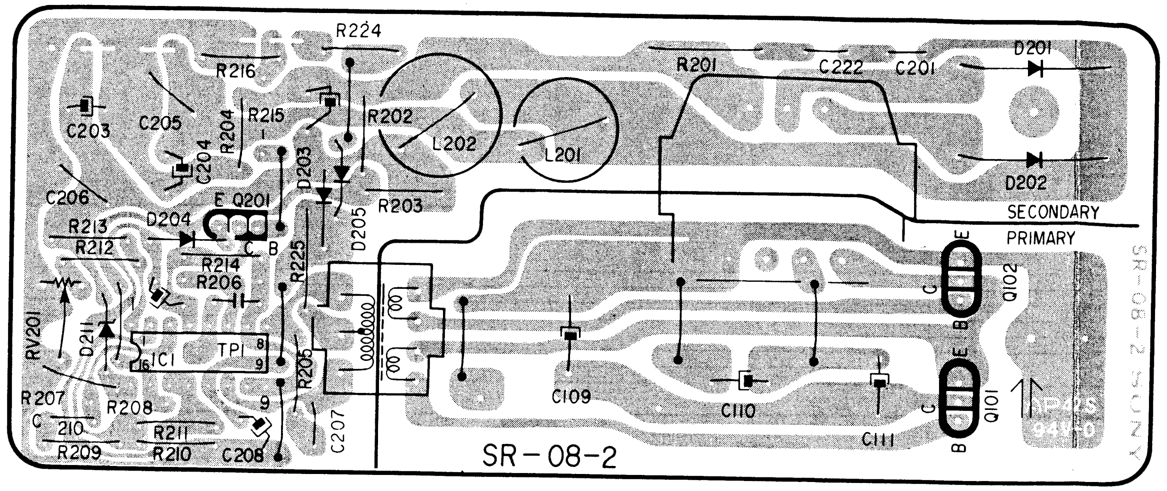

S-A6
2.5V
C104
R105
R103
R106
R104
D102
D101
IC101
FC5
FC1
C101
D103
T101
R101
R102
C105
TP101
D104
Q101
FC6
FC2
TP102
V101
Q102
TM-11
1-601-828-12
FC3
L101
C102
R105
C103
D105
FC7
FC4
D107
D106
R107
R108
D108
SW101
TIMER
OFF
ON
A

SR-08-1 BOARD

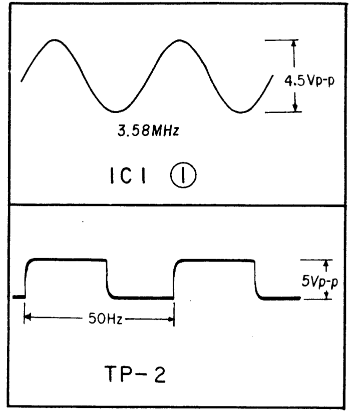

JAPAN
T101
SR-08-1
D104
L102
D103
C103
LFT
L101
C101
C104
C105
C108
D101
C106
C102
C107
D102
PRIMARY
SECONDARY
R101
Q205
R226
C219
R223
L203
R222
C221
D210
D209
Q206
C220
R221
RV202

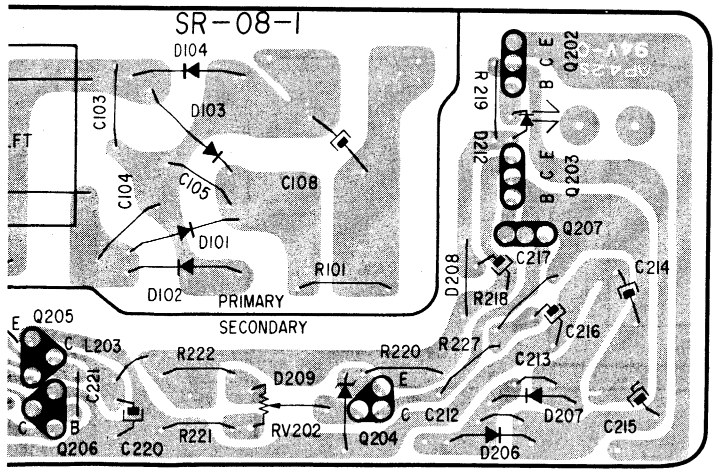

D201
C201
C202
D202
R207
R208
FC7
21

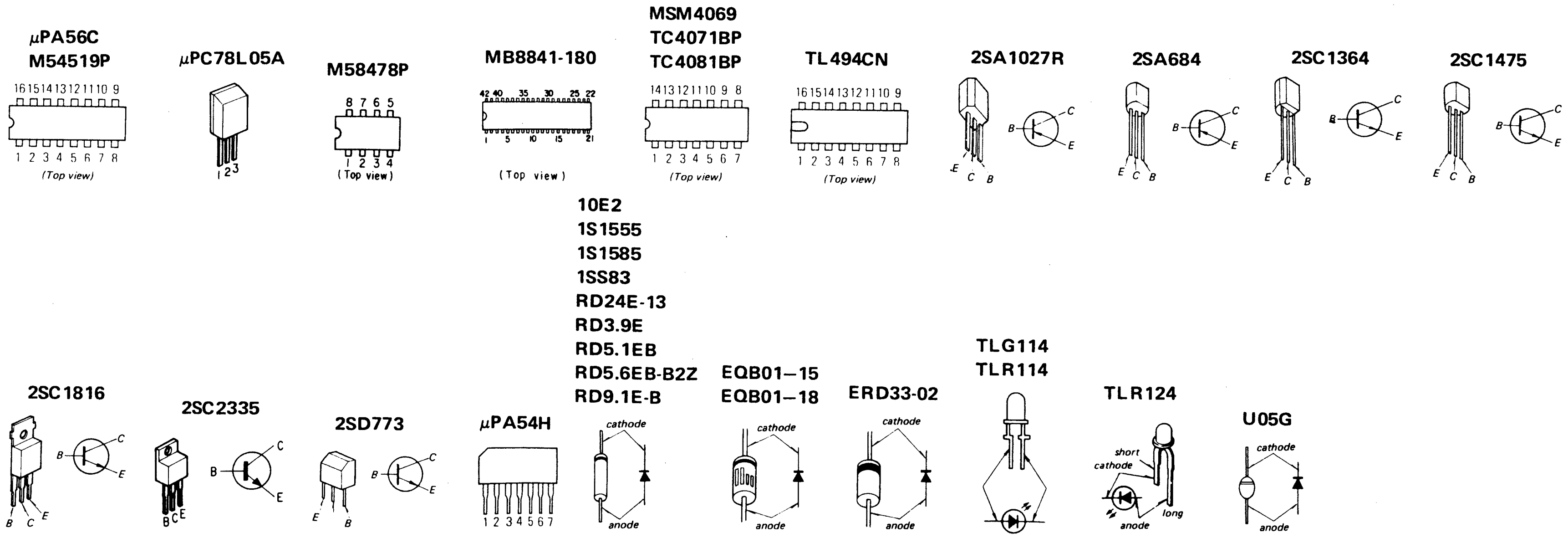
SR-08-2 BOARD


R224
R216
R201
C222
C201
D201
C203
C205
R204
R215
R202
L202
L201
C204
D203
D202
C206
Q201
D205
R203
SECONDARY
PRIMARY
R213
D204
E
C
B
R212
R214
R225
R206
Q102
RV201
D211
IC1
TP1
R205
Q101
R207
R208
C109
C110
C111
R209
R211
R210
C208
C207
SR-08-2

TM-10 BOARD

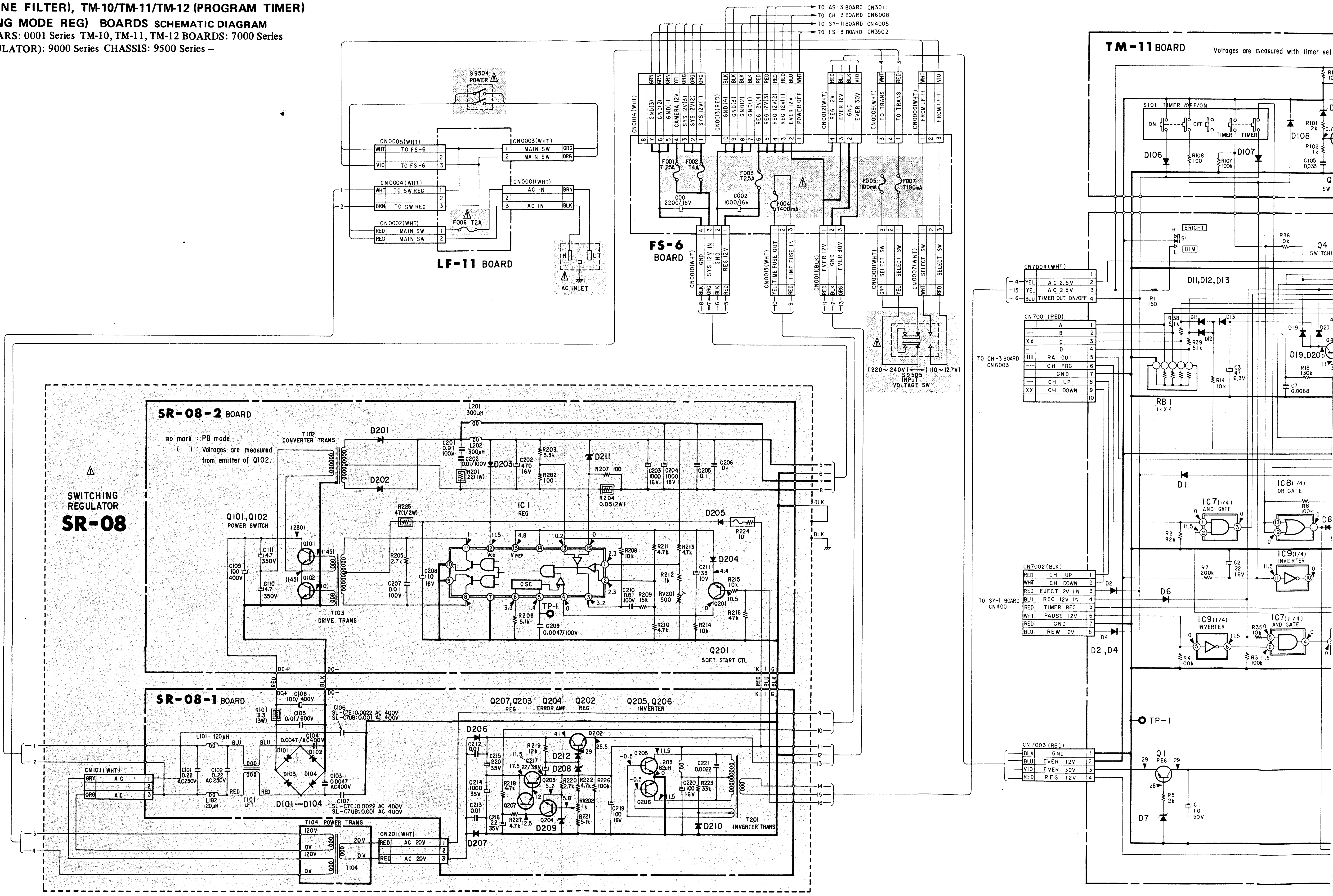


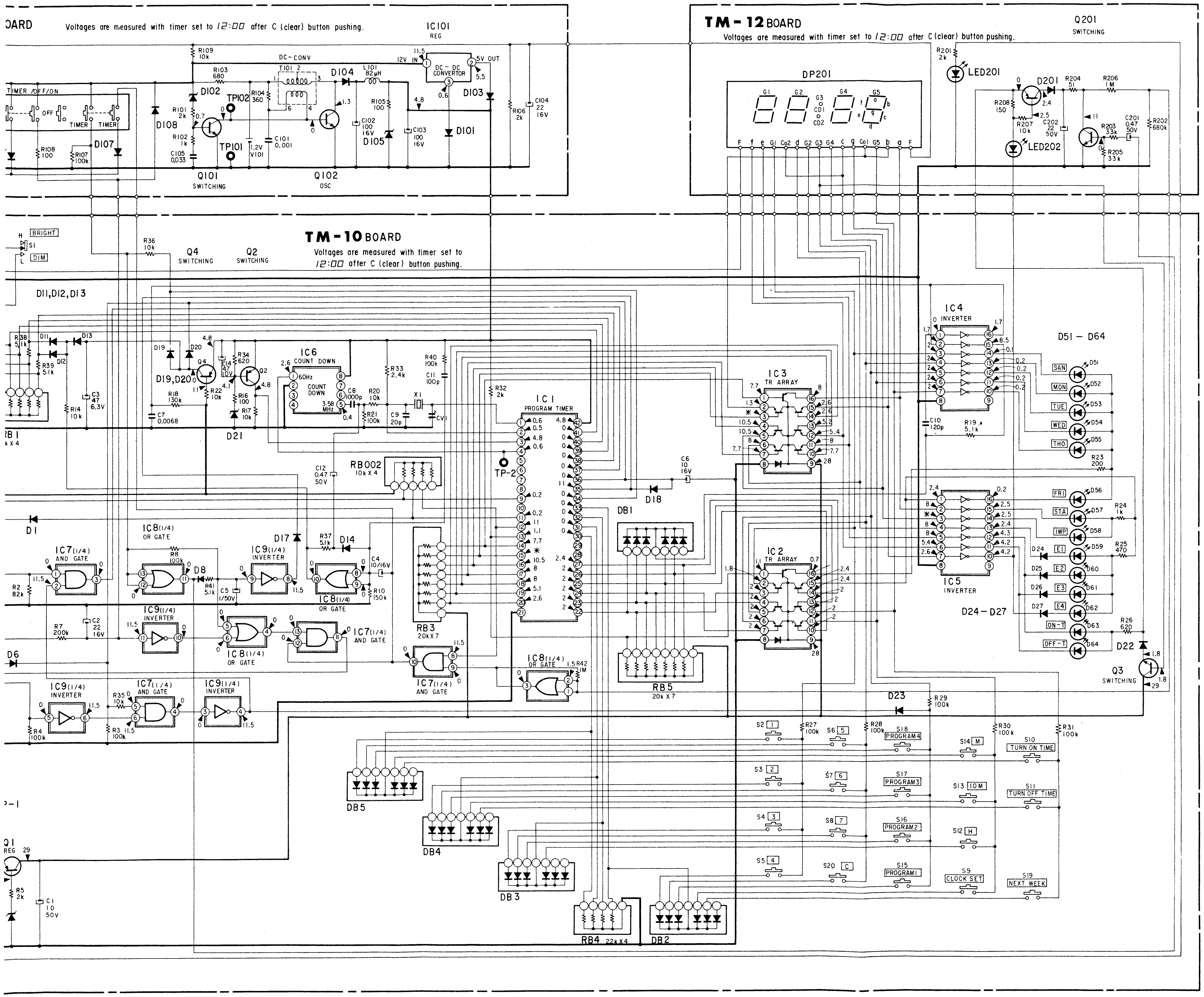

SR-08-1
D104
C103
D103
Q202
R219
D212
Q203
C104
C105
C108
D101
Q207
D208
C217
C214
D102
R101
PRIMARY
SECONDARY
R218
C216
Q205
L203
R222
R220
R227
C213
C221
D209
RV202
C212
D207
C215
R221
Q204
D206
Q206
C220


μPA56C
M54519P
16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8
(Top view)
μPC78L05A
1 2 3
M58478P
8 7 6 5
1 2 3 4
(Top view)
MB8841-180
42 40 35 30 25 22
1 5 10 15 21
(Top view)
MSM4069
TC4071BP
TC4081BP
14 13 12 11 10 9 8
1 2 3 4 5 6 7
(Top view)
TL494CN
16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8
(Top view)
2SA1027R
2SA684
2SC1364
2SC1475
E C B
B C E
10E2
1S1555
1S1585
1SS83
RD24E-13
RD3.9E
RD5.1EB
RD5.6EB-B2Z
RD9.1E-B
2SC1816
2SC2335
2SD773
μPA54H
1 2 3 4 5 6 7
EQB01-15
EQB01-18
ERD33-02
TLG114
TLR114
TLR124
U05G
cathode
anode
short
long

## FS-6 (FUSE), LF-11 (LINE FILTER), TM-10/TM-11/TM-12 (PROGRAM TIMER) AND SR-08 (SWITCHING MODE REG) BOARDS SCHEMATIC DIAGRAM

– Ref. No. FS-6, LF-11 BOARS: 0001 Series TM-10, TM-11, TM-12 BOARDS: 7000 Series
SR-08 (SWITCHING REGULATOR): 9000 Series CHASSIS: 9500 Series –


TO AS-3 BOARD CN3011
TO CH-3 BOARD CN6008
TO SY-11 BOARD CN4005
TO LS-3 BOARD CN3502
S9504 POWER
CN0005(WHT) TO FS-6
CN0003(WHT) MAIN SW
CN0004(WHT) TO SW REG
CN0001(WHT) AC IN
CN0002(WHT) MAIN SW
F006 T2A
LF-11 BOARD
AC INLET
CN0014(WHT)
GND(3) GND(2) GND(1) CAMERA 12V SYS 12V(3) SYS 12V(2) SYS 12V(1)
CN0013(RED)
REG 12V(4) REG 12V(3) REG 12V(2) REG 12V(1) EVER 12V POWER OFF
CN0012(WHT) REG 12V EVER 12V GND EVER 30V
CN0009(WHT) TO TRANS
CN0006(WHT) FROM LF-11
F001 T1.25A
F002 T4A
F003 T2.5A
F004 T400mA
F005 T100mA
F007 T100mA
C001 2200/16V
C002 1000/16V
FS-6 BOARD
CN0010(WHT) GND SYS 12V IN GND REG 12V
CN0015(WHT) TIME FUSE OUT TIME FUSE IN
CN0011(BLK) EVER 12V GND EVER 30V
CN0008(WHT) SELECT SW
CN0007(WHT) SELECT SW
(220~240V) (110~127V)
S9505 INPUT VOLTAGE SW
SWITCHING REGULATOR
SR-08
SR-08-2 BOARD
no mark : PB mode
( ) : Voltages are measured from emitter of Q102.
T102 CONVERTER TRANS
D201
D202
L201 300µH
L202 300µH
R201 22(1W)
D203
D211
R207 100
R204 0.05(2W)
IC1 REG
Q101,Q102 POWER SWITCH
T103 DRIVE TRANS
R225 47(1/2W)
TP-1
D205
D204
Q201 SOFT START CTL
RV201 500
SR-08-1 BOARD
L101 120µH
L102 120µH
T101 LFT
D101—D104
CN101(WHT) AC
C106 SL-C7E:0.0022 AC 400V SL-C7UB:0.001 AC 400V
C107 SL-C7E:0.0022 AC 400V SL-C7UB:0.001 AC 400V
T104 POWER TRANS
CN201(WHT) AC 20V
Q207,Q203 REG
Q204 ERROR AMP
Q202 REG
Q205,Q206 INVERTER
D206
D207
D208
D209
D210
D212
T201 INVERTER TRANS
TM-11 BOARD
Voltages are measured with timer set
S101 TIMER /OFF/ON
D106
D107
D108
CN7004(WHT) AC 2.5V AC 2.5V TIMER OUT ON/OFF
D11,D12,D13
CN7001(RED) A B C D RA OUT CH PRG GND CH UP CH DOWN
TO CH-3 BOARD CN6003
RB1 1kX4
BRIGHT DIM
Q4 SWITCH
D19,D20
D1
IC7(1/4) AND GATE
IC8(1/4) OR GATE
IC9(1/4) INVERTER
CN7002(BLK) CH UP CH DOWN EJECT 12V IN REC 12V IN TIMER REC PAUSE 12V GND REW 12V
TO SY-11 BOARD CN4001
D2,D4
D6
TP-1
CN7003(RED) GND EVER 12V EVER 30V REG 12V
Q1 REG
D7


OARD
Voltages are measured with timer set to 12:00 after C (clear) button pushing.
IC101 REG
DC-CONV
DC-DC CONVERTOR
5V OUT
TIMER /OFF/ON
TPI02
TPI01
Q101 SWITCHING
Q102 OSC
D101
D102
D103
D104
D105
D107
D108
TM-12 BOARD
Voltages are measured with timer set to 12:00 after C (clear) button pushing.
Q201 SWITCHING
DP201
LED201
LED202
D201
TM-10 BOARD
Voltages are measured with timer set to 12:00 after C (clear) button pushing.
BRIGHT
DIM
Q4 SWITCHING
Q2 SWITCHING
D11,D12,D13
IC6 COUNT DOWN
IC1 PROGRAM TIMER
IC3 TR ARRAY
IC2 TR ARRAY
IC4 INVERTER
IC5 INVERTER
D51 – D64
SAN
MON
TUE
WED
THO
FRI
STA
IWP
E1
E2
E3
E4
ON-T
OFF-T
D24 – D27
D22
Q3 SWITCHING
RB002
RB3
RB4
RB5
DB1
DB2
DB3
DB4
DB5
D18
D23
TP-2
IC7(1/4) AND GATE
IC8(1/4) OR GATE
IC9(1/4) INVERTER
S1
S2 1
S3 2
S4 3
S5 4
S6 5
S7 6
S8 7
S9 CLOCK SET
S10 TURN ON TIME
S11 TURN OFF TIME
S12 H
S13 10M
S14 M
S15 PROGRAM1
S16 PROGRAM2
S17 PROGRAM3
S18 PROGRAM4
S19 NEXT WEEK
S20 C
Q1 REG

NOTES:

- All resistors are in ohms, ¼ W unless otherwise noted. kΩ = 1000Ω; MΩ = 1000kΩ
- All capacitors are in μF unless otherwise noted. p : μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- —[⩘⩘⩘]— : nonflammable resistor.
- The red lines show the main voltages.
- All voltages are dc measured with a VOM (20kΩ/V).

**The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.**

# SECTION 4
# EXPLODED VIEWS

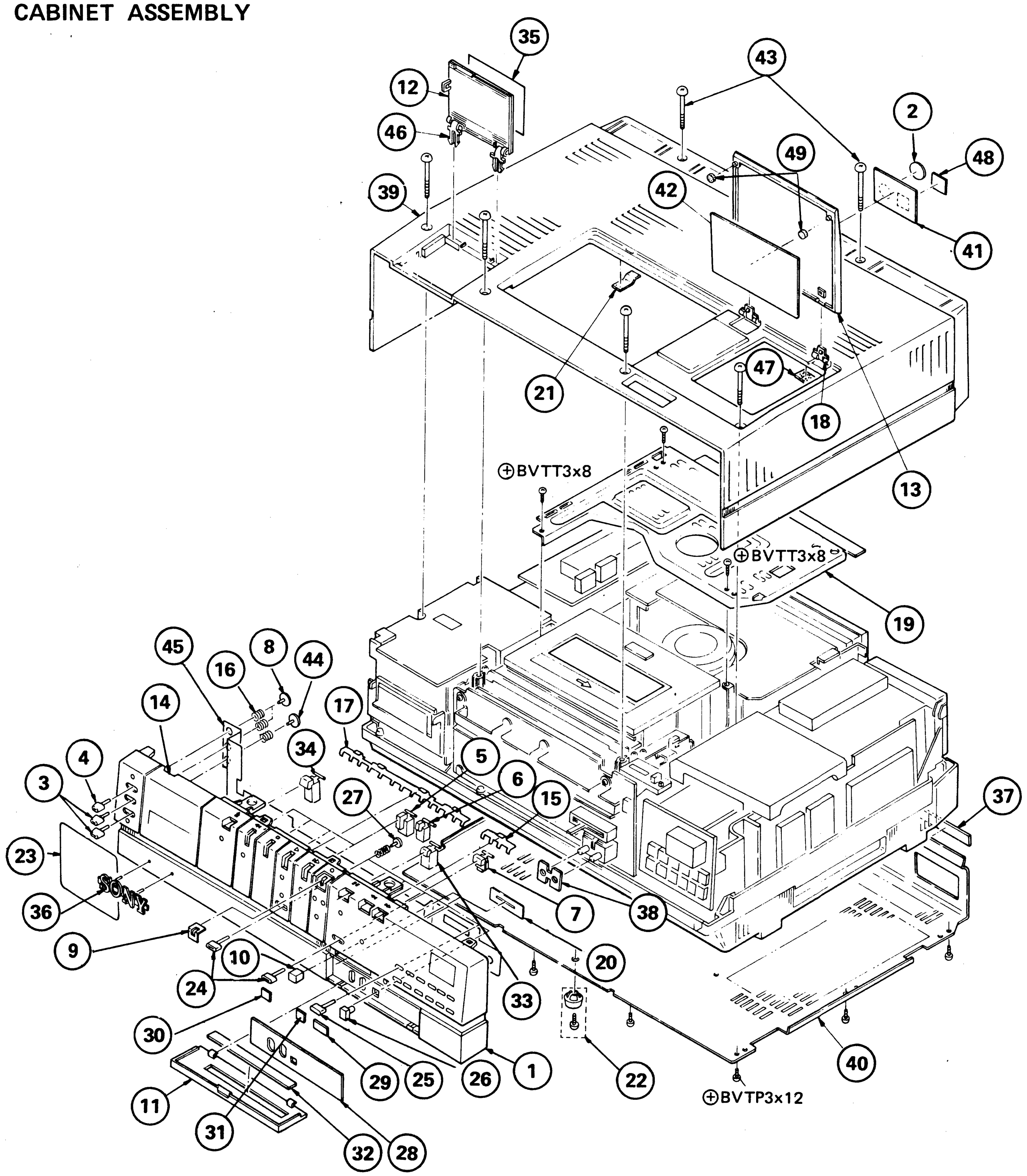
Note:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
- As to the part numbered with E-, refer to the electrical parts list.
- Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The construction parts of an assembled part are indicated with a collation number in the remark column.

A B C

1 2 3 4

## CABINET ASSEMBLY



| No. | Part No. | Description | Remark |
|---|---|---|---|
| 1 | A-6703-062-A | PANEL ASS'Y, front | 3–9, 11, 14–17, 20, 23–34, 36, 44, 45 |
| 2 | ♦3-656-407-00 | LABEL, F mark | |
| 3 | 3-659-535-01 | SWITCH, P | |
| 4 | 3-659-535-11 | SWITCH, P | |
| 5 | 3-659-537-00 | BUTTON(2), F | |
| 6 | 3-659-538-00 | BUTTON (3), F | |
| 7 | 3-659-539-00 | BUTTON(4), F | |
| 8 | 3-659-542-00 | RETAINER, spring | |
| 9 | 3-659-543-00 | PLATE, ornamental; REC button | |
| 10 | 3-659-547-00 | KNOB, control | |
| 11 | 3-659-589-21 | DOOR, front | |
| 12 | 3-659-590-00 | LID, timer | |
| 13 | 3-659-599-21 | DOOR, preset | |
| 14 | 3-659-606-00 | WINDOW, timer | |
| 15 | 3-659-607-00 | RETAINER(2), button | |
| 16 | 3-659-609-00 | SPRING, compression | |
| 17 | 3-659-616-00 | RETAINER(1), button | |
| 18 | 3-659-618-00 | HINGE, spring | |
| 19 | ♦3-659-671-00 | COVER, shield | |
| 20 | 3-659-746-00 | CLOTH, masking; VR | |
| 21 | 3-659-748-00 | CLOTH, masking; upper case | |
| 22 | 3-659-768-00 | FOOT | |
| 23 | 3-660-901-00 | COVER, front; timer | |
| 24 | 3-662-211-00 | BUTTON, SF | |
| 25 | 3-662-212-00 | BUTTON, tuning | |
| 26 | 3-662-213-00 | BUTTON, DUB | |
| 27 | 3-662-214-00 | RETAINER(2), spring | |
| 28 | 3-662-217-00 | INDICATOR | |
| 29 | 3-662-218-00 | PLATE, indication; DUB | |
| 30 | 3-662-219-00 | PLATE, indication; STILL | |
| 31 | 3-662-220-00 | PLATE, indication; SLOW | |
| 32 | 3-662-236-00 | LABEL(E), front door | |
| 33 | 3-662-247-00 | BUTTON(PAUSE), F | |
| 34 | 3-662-248-00 | BUTTON(EJECT), F | |
| 35 | 3-662-252-00 | STICKER(E), timer | |
| 36 | 3-662-253-00 | EMBLEM, SONY | |
| 37 | 3-662-260-00 | LABEL, input/output | |
| 38 | 3-662-269-00 | CLOTH, masking; switch | |
| 39 | 3-662-292-00 | CASE, upper | |
| 40 | 3-662-293-00 | PLATE, bottom | |
| 41 | ♦3-662-306-00 | LABEL, model number | |
| 42 | 3-662-321-00 | LABEL, preset manual | |
| 43 | 3-662-325-00 | SCREW, tap | |
| 44 | 3-662-339-00 | RETAINER(3), spring | |
| 45 | 3-662-340-00 | PLATE(F), shield | |
| 46 | 3-703-035-11 | SHAFT, LTD | |
| 47 | 3-831-441-XX | CLOTH(2), masking; upper case | |
| 48 | 4-310-380-00 | LABEL, DEMKO | |
| 49 | 4-314-871-00 | CUSHION | |

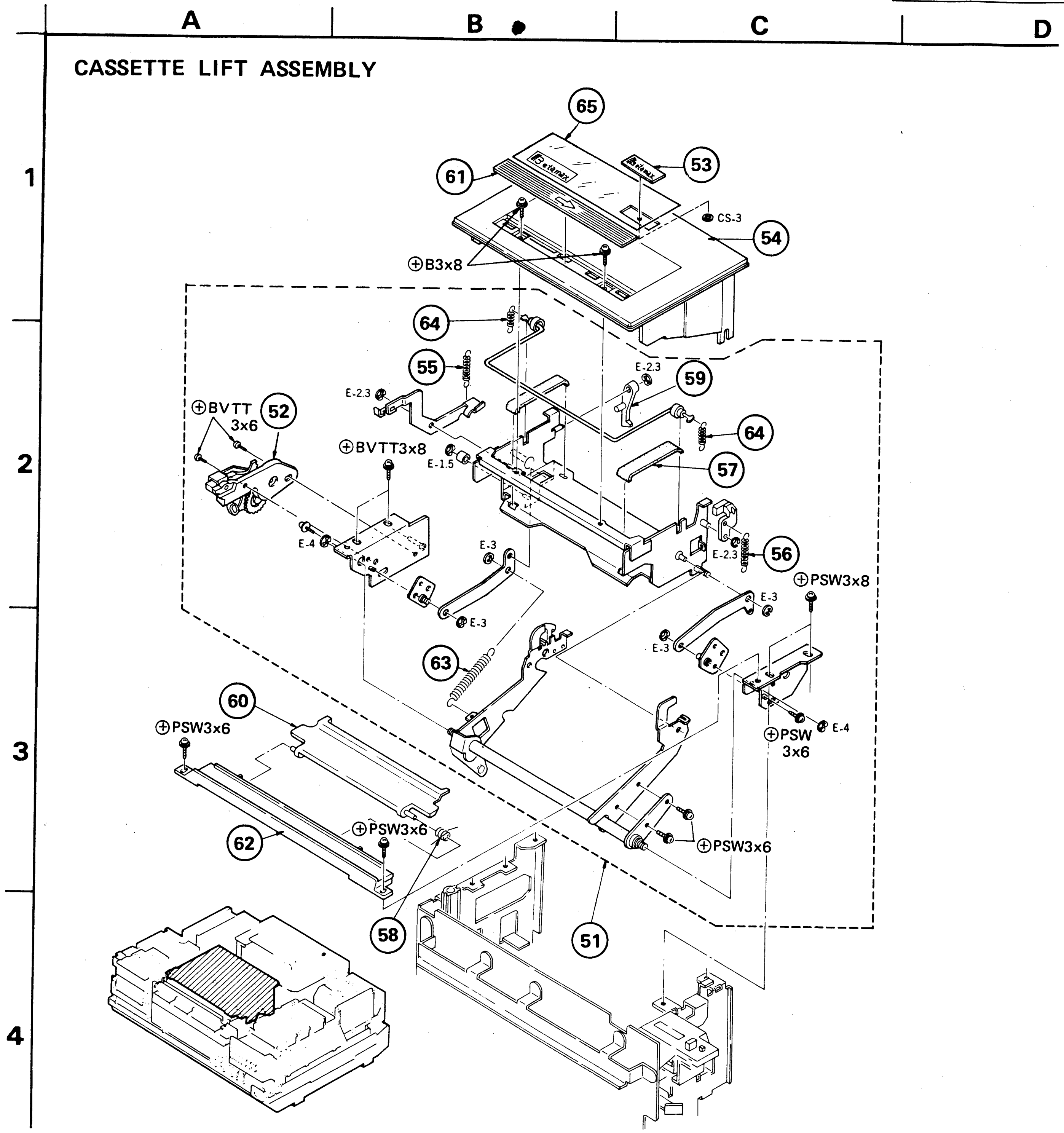
CASSE

1 2 3 4

| No. | Part N |
|---|---|
| 51 | A-675 |
| 52 | A-675 |
| 53 | X-365 |
| 54 | X-366 |
| 55 | 3-536 |
| 56 | 3-642 |
| 57 | 3-659 |

mark

## CASSETTE LIFT ASSEMBLY

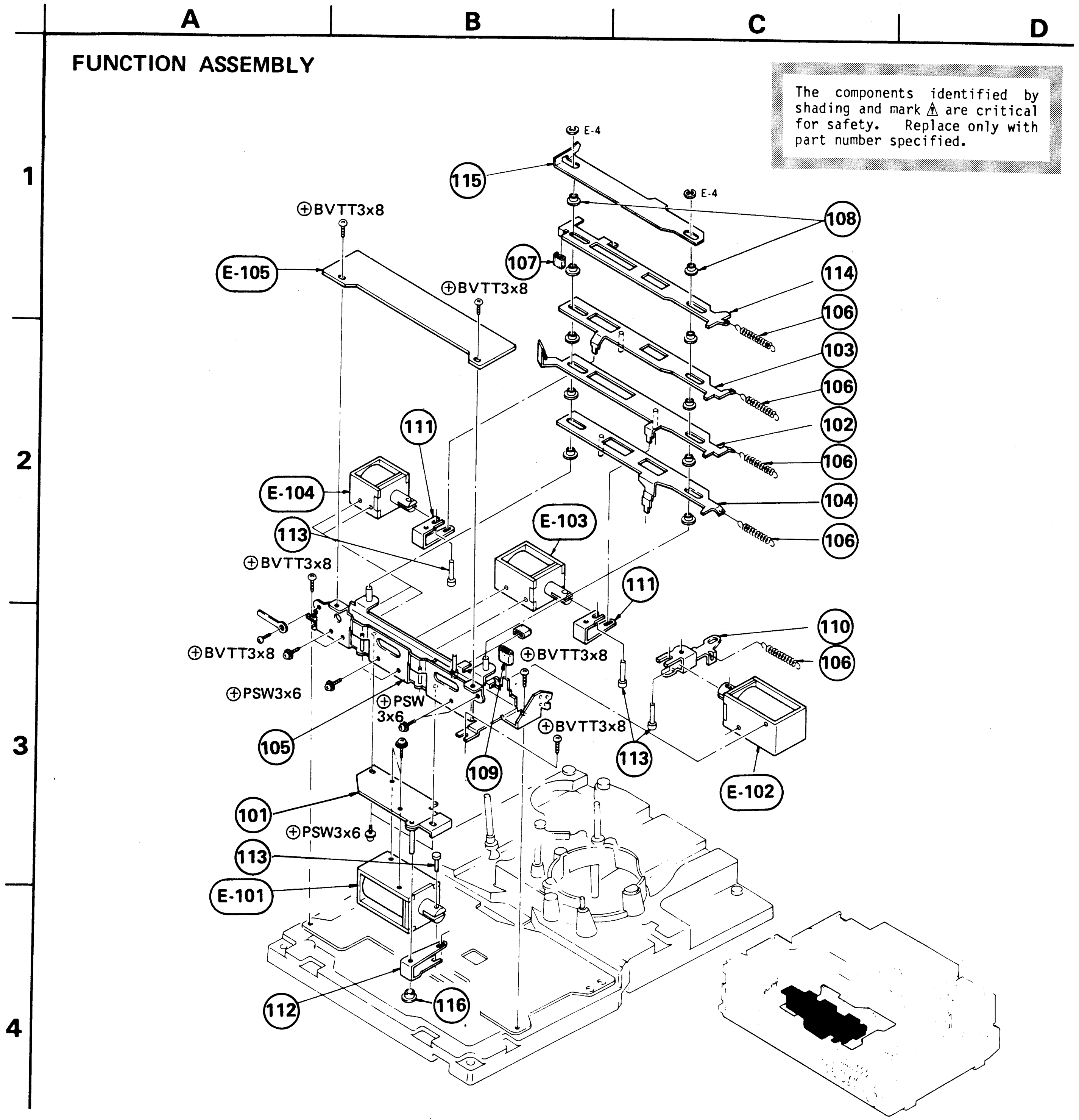

A
B
C
D
1
2
3
4
65
61
53
54
CS-3
⊕B3x8
64
55
E-2.3
59
E-2.3
⊕BVTT 3x6
52
⊕BVTT3x8
E-1.5
64
57
E-4
E-3
E-2.3
56
⊕PSW3x8
E-3
E-3
63
E-3
60
⊕PSW3x6
E-4
⊕PSW 3x6
⊕PSW3x6
⊕PSW3x6
62
58
51

| No. | Part No. | Description | Remark |
|---|---|---|---|
| 51 | A-6751-061-A | CASSETTE-UP BLOCK ASS'Y | 52, 55–57, 59, 63, 64 |
| 52 | A-6751-079-A | DAMPER ASS'Y | |
| 53 | X-3658-101-0 | EMBLEM ASS'Y (P) | |
| 54 | X-3662-214-0 | LID ASS'Y, cassette-up | 53, 65 |
| 55 | 3-536-006-XX | SPRING, tension | |
| 56 | 3-642-490-00 | SPRING, tension | |
| 57 | 3-659-498-00 | CUSHION, cassette holder | |

| No. | Part No. | Description | Remark |
|---|---|---|---|
| 58 | 3-659-531-00 | SPRING | |
| 59 | 3-659-579-00 | LEVER, release lid lock | |
| 60 | 3-659-583-00 | PLATE, blind cassette | |
| 61 | 3-659-585-00 | STRIP, ornamental cassette | |
| 62 | 3-659-598-21 | GUIDE, cassette | |
| 63 | 3-659-635-00 | SPRING, tension | |
| 64 | 3-659-636-00 | SPRING, tension | |
| 65 | 3-662-263-00 | STICKER, C7E | |

## FUNCTION ASSEMBLY

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.


A
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E-4
E-4
115
108
⊕BVTT3x8
E-105
107
⊕BVTT3x8
114
106
103
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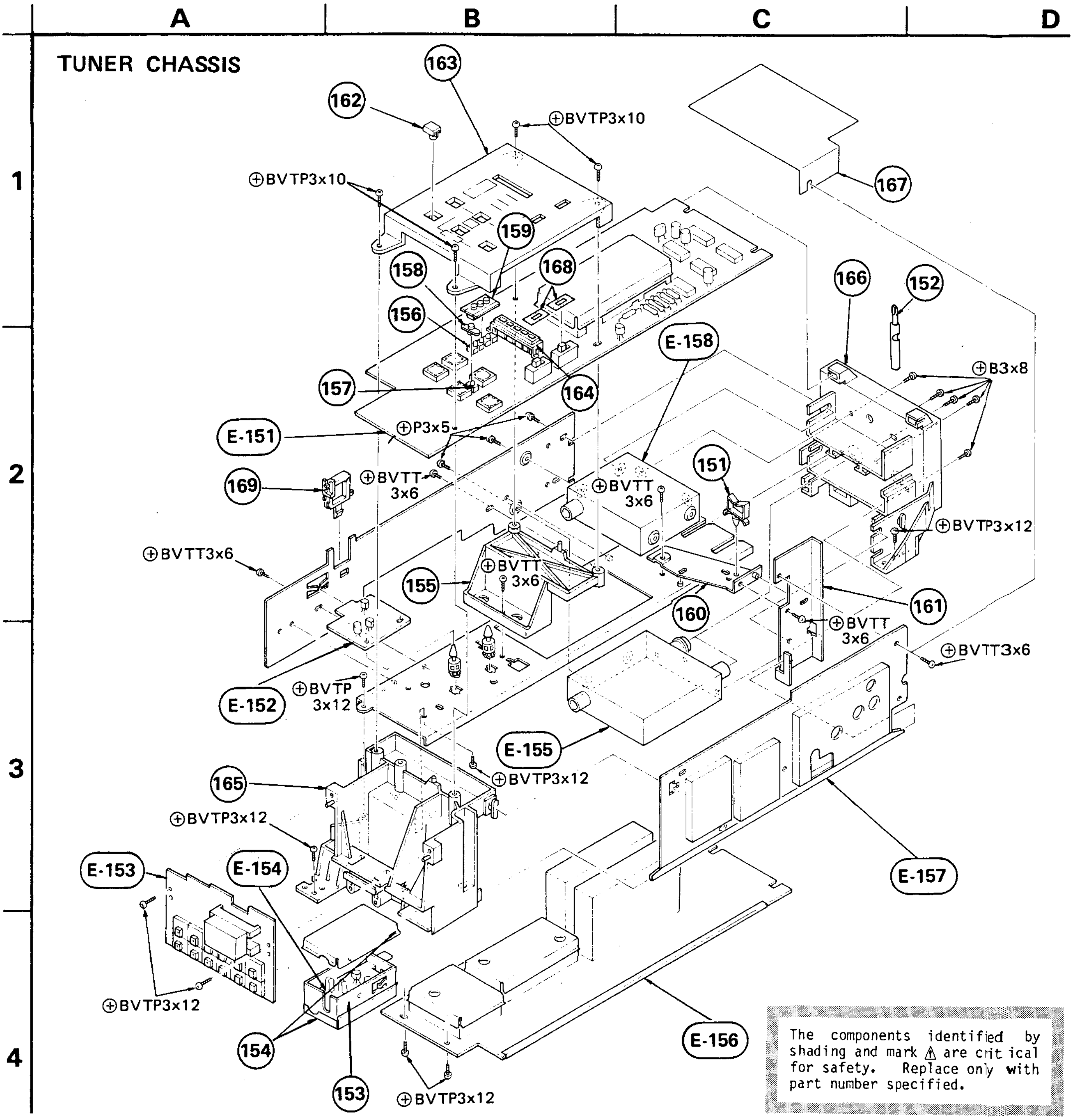
102
106
104
106
111
E-104
113
⊕BVTT3x8
E-103
111
110
106
⊕BVTT3x8
⊕BVTT3x8
⊕PSW3x6
⊕PSW 3x6
⊕BVTT3x8
105
109
113
E-102
101
⊕PSW3x6
113
E-101
112
116

| No. | Part No. | Description | Remark |
|---|---|---|---|
| 101 | ● X-3659-329-0 | BASE ASS'Y, E solenoid | |
| 102 | ● X-3659-341-0 | PLATE ASS'Y, slide; F | |
| 103 | ● X-3659-342-0 | PLATE ASS'Y, slide; R | |
| 104 | ● X-3659-343-0 | PLATE ASS'Y, slide; E | |
| 105 | ● X-3659-353-0 | FRAME ASS'Y, F solenoid | |
| 106 | 3-536-006-XX | SPRING, tension | |
| 107 | ● 3-537-790-21 | SUPPORT, tension; arm | |
| 108 | 3-646-271-00 | BOSS | |
| 109 | 3-655-856-11 | RETAINER, tension regulator | |
| 110 | ● 3-659-478-00 | LEVER, F | |

| No. | Part No. | Description | Remark |
|---|---|---|---|
| 111 | ● 3-659-479-00 | LEVER, FR | |
| 112 | ● 3-659-480-00 | LEVER, E | |
| 113 | 3-659-481-00 | PIN, solenoid | |
| 114 | ● 3-659-569-00 | PLATE, slide; B | |
| 115 | ● 3-659-790-00 | PLATE, slide; FB | |
| 116 | 3-703-074-00 | CAP 3, shaft | |
| ⚠ E-101 | 1-454-213-00 | Solenoid, EJECT | SL9501 |
| ⚠ E-102 | 1-454-214-00 | Solenoid, FWD | SL9504 |
| ⚠ E-103 | 1-454-215-00 | Solenoid, CUE | SL9503 |
| ⚠ E-104 | 1-454-216-00 | Solenoid, REVIEW | SL9502 |
| E-105 | ● 1-601-821-00 | PL-2 Board | |

## TUNER CHASSIS


A
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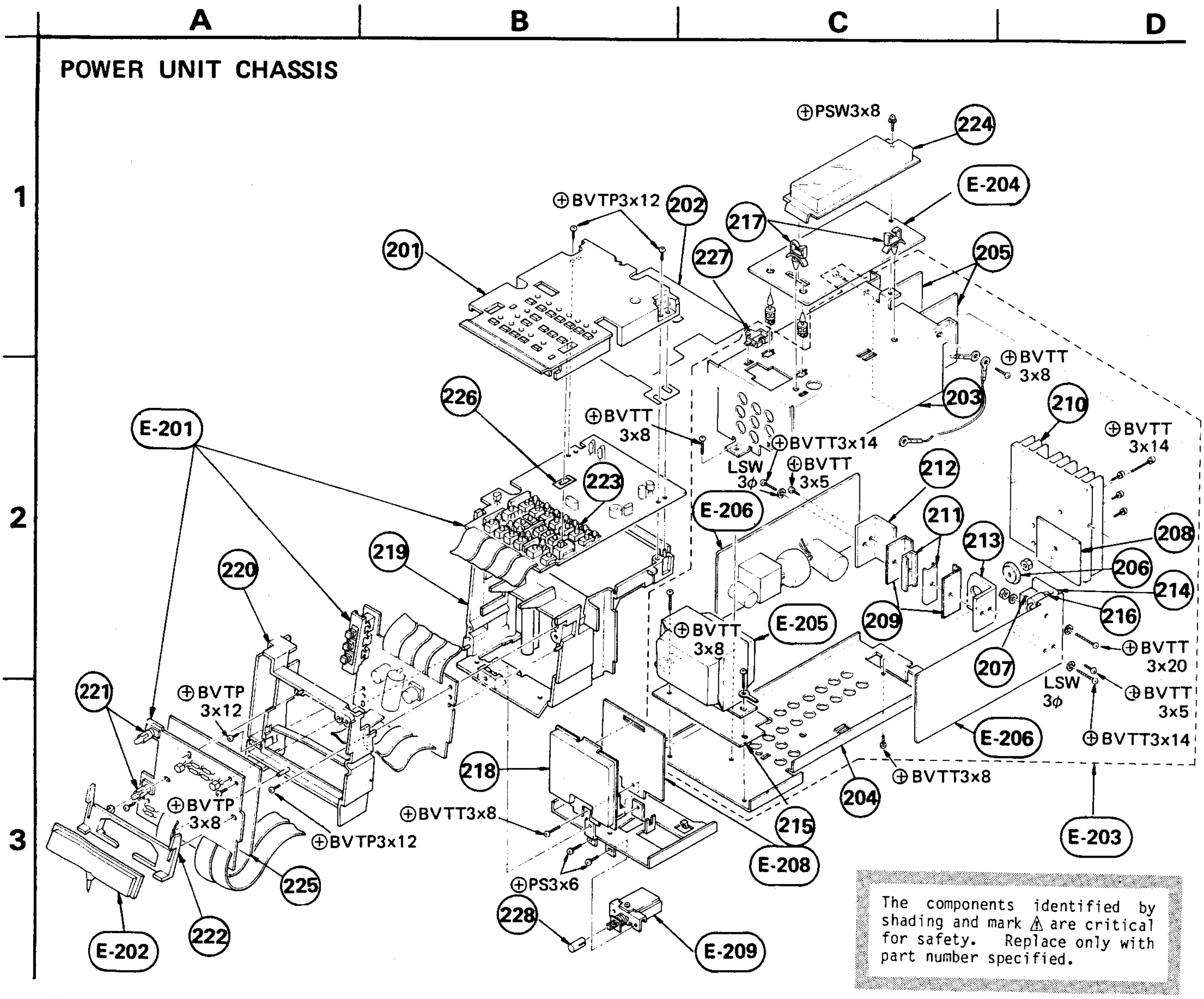
163
162
⊕BVTP3x10
⊕BVTP3x10
167
159
158
168
156
166
152
E-158
⊕B3x8
157
164
E-151
⊕P3x5
169
⊕BVTT 3x6
151
⊕BVTT 3x6
⊕BVTP3x12
⊕BVTT3x6
⊕BVTT 3x6
155
161
160
⊕BVTT 3x6
⊕BVTT3x6
E-152
⊕BVTP 3x12
E-155
165
⊕BVTP3x12
⊕BVTP3x12
E-153
E-154
E-157
⊕BVTP3x12
E-156
154
153
⊕BVTP3x12

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

| No. | Part No. | Description | Remark |
|---|---|---|---|
| 151 | ♦3-655-214-00 | CLIP, cable | |
| 152 | 3-656-301-00 | SCREWDRIVER, control | |
| 153 | ♦3-662-215-00 | CASE, shield | |
| 154 | ♦3-662-216-00 | LID, shield case | |
| 155 | ♦3-662-226-00 | RETAINER, preset | |
| 156 | ♦3-662-227-00 | HOLDER (R-3), LED | |
| 157 | ♦3-662-228-00 | HOLDER (R-1), LED | |
| 158 | 3-662-229-00 | COVER, (L-1), lamp | |
| 159 | 3-662-230-00 | COVER, (L-3), lamp | |
| 160 | ♦3-662-234-00 | REINFORCEMENT, IF | |
| 161 | ♦3-662-242-00 | BRACKET, IF | |
| 162 | 3-662-243-00 | BUTTON, preset | |
| 163 | 3-662-281-00 | PLATE, ornamental; preset | |
| 164 | 3-662-282-00 | ESCUTCHEON, 5 gang LED | |
| 165 | ♦3-662-288-00 | CHASSIS (F), tuner | |
| 166 | 3-662-289-00 | CHASSIS (B), tuner | |
| 167 | ♦3-662-324-00 | PLATE, shield; TU | |
| 168 | 3-831-441-XX | CLOTH, masking | |
| 169 | ♦4-316-015-00 | HOLDER, wire | |
| E-151 | ♦A-6725-154-A | CH-3 Board, complete | |
| E-152 | ♦1-601-835-00 | PC-1 Board | |
| E-153 | ♦1-601-831-00 | CI-1 Board | |
| E-154 | ♦1-601-834-00 | IR-1 Board | |
| ⚠E-155 | 1-463-296-00 | Antenna booster BT-971 | |
| E-156 | ♦A-6721-037-A | TU-11 Board, complete | |
| E-157 | ♦A-6721-038-A | IF-10 Board, complete | |
| ⚠E-158 | 1-464-105-00 | RF Modulator | |

## POWER UNIT CHASSIS


A
B
C
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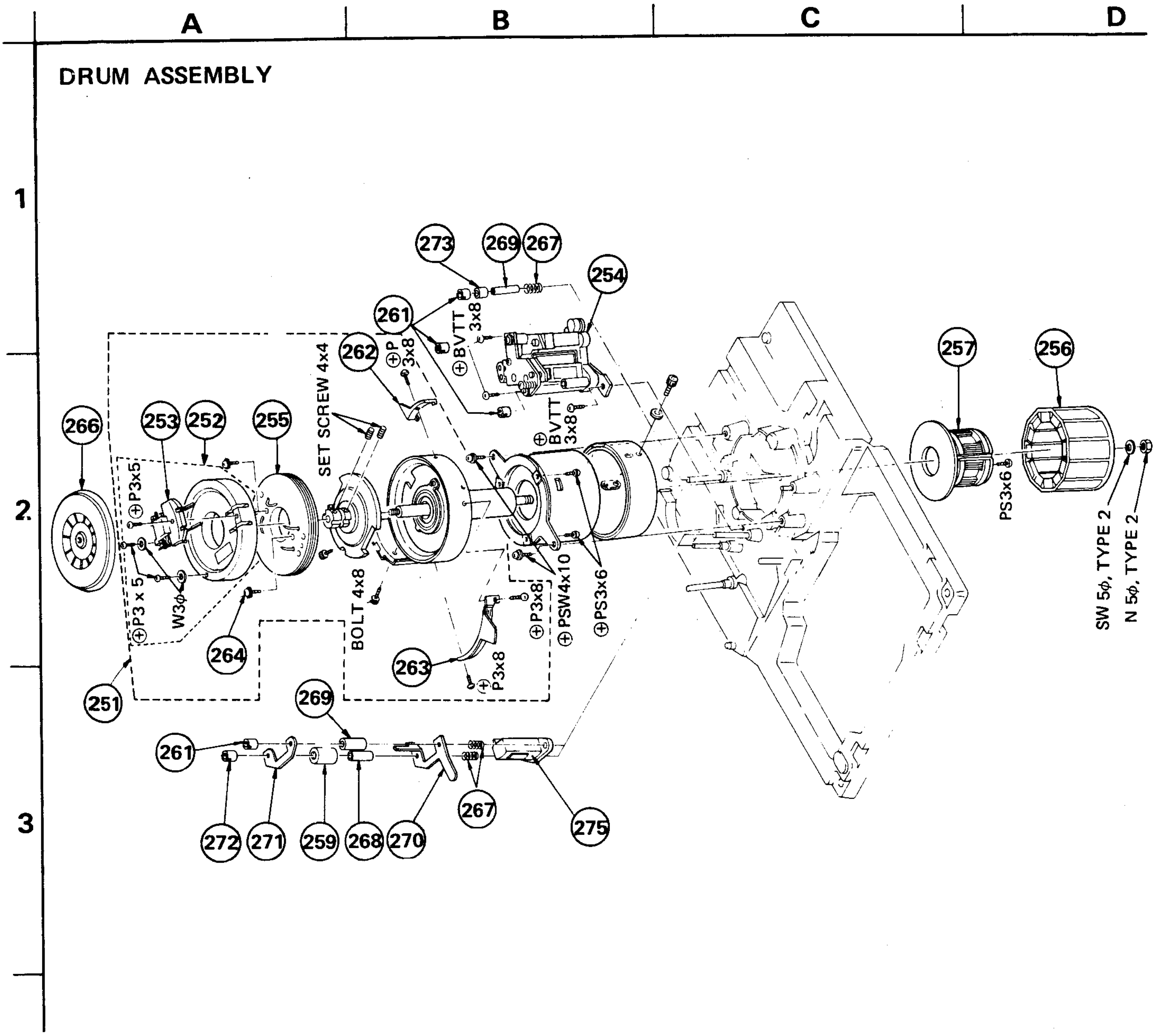
3
⊕PSW3x8
224
E-204
⊕BVTP3x12
202
217
201
227
205
⊕BVTT 3x8
203
210
226
⊕BVTT 3x8
⊕BVTT 3x14
E-201
⊕BVTT3x14
LSW 3φ
⊕BVTT 3x5
212
223
E-206
211
208
219
213
206
220
214
216
⊕BVTT 3x8
E-205
209
207
⊕BVTT 3x20
LSW 3φ
⊕BVTT 3x5
221
⊕BVTP 3x12
E-206
⊕BVTT3x14
218
⊕BVTT3x8
⊕BVTP 3x8
204
⊕BVTT3x8
215
E-203
⊕BVTP3x12
E-208
225
⊕PS3x6
228
E-202
222
E-209

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

| No. | Part No. | Description | Remark |
|---|---|---|---|
| 201 | X-3662-212-0 | PANEL ASS'Y, timer.......... | 202 |
| 202 | ♦X-3662-223-0 | PLATE (T) ASS'Y, shield | |
| 203 | ♦2-403-428-00 | CASE, upper | |
| 204 | ♦2-403-429-00 | CASE, lower | |
| 205 | ♦2-430-138-00 | PLATE, insulating | |
| 206 | 2-430-117-00 | WASHER, insulating | |
| 207 | ♦2-430-131-00 | RETAINER, transistor | |
| 208 | 2-430-132-00 | SHEET, rubber (large) | |
| 209 | 2-430-133-00 | SHEET, rubber (small) | |
| 210 | ♦2-430-609-00 | HEAT SINK | |
| 211 | ♦2-430-610-00 | RETAINER, transistor | |
| 212 | ♦2-430-611-00 | HEAT SINK, L type | |
| 213 | ♦2-430-612-00 | HEAT SINK, L type | |
| 214 | ♦2-430-613-00 | HEAT SINK, L type | |
| 215 | ♦2-430-633-00 | PLATE, shield | |
| 216 | 2-832-004-02 | WASHER, insulating | |
| 217 | ♦3-655-214-00 | CLIP, cable | |
| 218 | 3-659-516-00 | COVER, LF-9 PC board | |

| No. | Part No. | Description | Remark |
|---|---|---|---|
| 219 | ♦3-659-674-00 | FRAME, rear timer | |
| 220 | ♦3-659-677-00 | FRAME, front timer | |
| 221 | 3-659-684-00 | HOLDER, power lamp | |
| 222 | ♦3-661-537-00 | HOLDER (Z), indication tube | |
| 223 | ♦3-662-205-00 | HOLDER (E), LED | |
| 224 | ♦3-662-206-00 | COVER, FS-6 | |
| 225 | 3-662-344-00 | COVER, TM | |
| 226 | 3-831-441-XX | CLOTH, masking | |
| 227 | 4-310-385-00 | HOLDER, wire | |
| 228 | 4-334-115-00 | KNOB, clock day | |
| E-201 | ♦A-6725-151-A | B-25 Board, complete (including TM-10, TM-11, TM-12 boards) | |
| E-202 | 1-519-174-00 | Indicator, tube | DP201 |
| ⚠E-203 | 1-413-045-00 | Switching regulator, SR-08 | |
| E-204 | ♦1-601-825-00 | FS-6 Board | |
| ⚠E-205 | 1-446-589-12 | POWER TRANS | T104 |
| ⚠E-206 | ♦2-402-645-00 | SR-08-1 Board (including SR-08-2) | |
| E-208 | ♦1-601-826-00 | LF-11 Board | |
| ⚠E-209 | 1-516-277-00 | Push, POWER | S9504 |

## DRUM ASSEMBLY


A
B
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1
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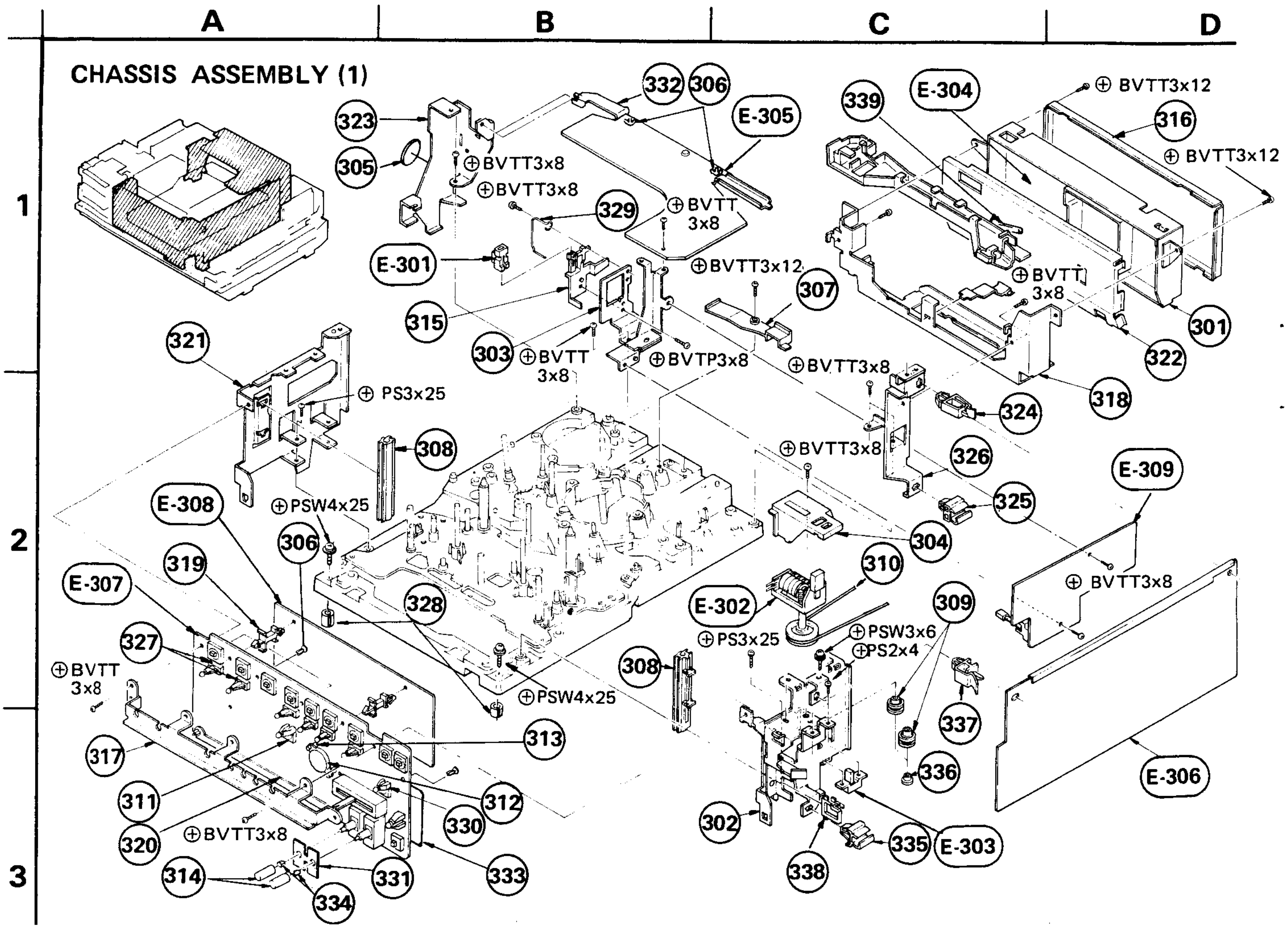
273
269
267
254
261
262
⊕P 3x8
⊕BVTT 3x8
SET SCREW 4x4
257
256
266
253
252
255
⊕P3x5
⊕P3 x 5
W3φ
264
251
BOLT 4x8
263
⊕P3x8
⊕PSW4x10
⊕PS3x6
PS3x6
SW 5φ, TYPE 2
N 5φ, TYPE 2
269
261
272
271
259
268
270
267
275

| No. | Part No. | Description | Remark |
|---|---|---|---|
| 251 | A-6050-057-A | DRUM ASS'Y, DSH-08A-R. | 252, 253, 255, 262, 263, 264, |
| 252 | A-6760-050-A | DRUM ASS'Y, upper | 253 |
| 253 | A-6761-013-B | SPRING ASS'Y, tape retainer | |
| 254 | A-6761-035-A | A.C.E. ASS'Y | 261 |
| 255 | A-6762-129-A | VIDEO HEAD DISK ASS'Y (DSR-36-R) | |
| 256 | ♦X-2619-402-0 | ROTOR ASS'Y | |
| 257 | X-2619-403-0 | STATOR ASS'Y | |
| 259 | X-3659-304-0 | ROLLER ASS'Y, guide; No. 1 | |
| 261 | 3-645-562-00 | NUT | |
| 262 | 3-652-728-00 | BRACKET (B), tape | |
| 263 | 3-652-741-00 | BRACKET (A), tape | |
| 264 | 3-652-751-00 | SCREW ( ⊕ P EXT tooth WS 3 ×8) | |
| 266 | 3-658-122-00 | FAN | |
| 267 | 3-659-324-00 | SPRING, compression | |
| 268 | 3-659-341-00 | SLEEVE, guide; No. 1 | |
| 269 | 3-659-342-00 | SLEEVE, guide; No. 2 | |
| 270 | ♦3-659-343-00 | BRACKET, tape; entrance | |
| 271 | 3-659-344-00 | PLATE, guide; entrance | |
| 272 | 3-659-345-00 | NUT, guide; No. 1 | |
| 273 | 3-659-716-00 | FLANGE, guide | |
| 275 | 8-825-687-30 | HEAD, full erase EF182-21 | |

## CHASSIS ASSEMBLY (1)


A
B
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332
306
E-305
339
E-304
⊕ BVTT3x12
316
⊕ BVTT3x12
323
305
⊕BVTT3x8
⊕BVTT3x8
329
⊕BVTT 3x8
E-301
⊕BVTT3x12
307
⊕BVTT 3x8
301
315
303
⊕BVTT 3x8
⊕BVTP3x8
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318
321
⊕ PS3x25
324
308
⊕BVTT3x8
326
E-309
E-308
⊕PSW4x25
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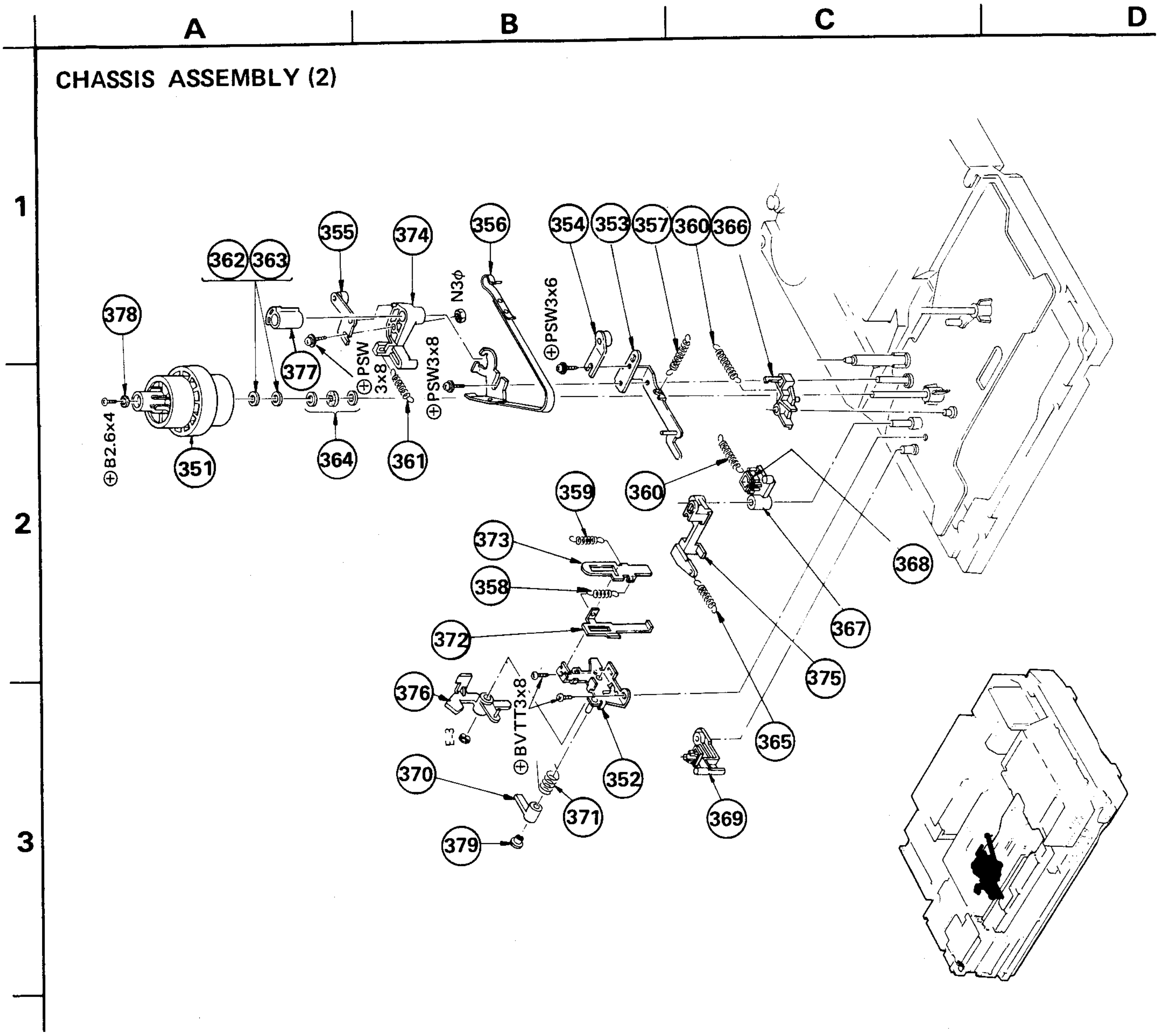
304
319
310
E-307
328
E-302
309
⊕ BVTT3x8
⊕PS3x25
⊕PSW3x6
⊕PS2x4
327
⊕BVTT 3x8
308
⊕PSW4x25
337
313
317
336
E-306
311
312
330
302
320
⊕BVTT3x8
335
E-303
314
331
333
338
334

| No. | Part No. | Description | Remark |
|---|---|---|---|
| 301 | ♠X-3659-339-0 | CASE (A) MAIN ASS'Y, shield | |
| 302 | ♠X-3659-352-0 | BRACKET (RIGHT) ASS'Y, cassette | |
| 303 | ♠X-3659-361-0 | OPENER ASS'Y, lid | |
| 304 | X-3662-205-0 | COVER ASS'Y, counter | |
| 305 | 3-418-709-00 | INDICATED, ground terminal | |
| 306 | 3-646-090-00 | RIVET, nylon | |
| 307 | ♠3-659-303-00 | RETAINER (SMALL), harness | |
| 308 | ♠3-659-482-00 | SUPPORT | |
| 309 | 3-659-484-00 | PULLEY, midway; counter | |
| 310 | 3-659-485-00 | BELT, counter | |
| 311 | ♠3-659-486-00 | HOLDER (C), LED | |
| 312 | 3-659-487-00 | HOLDER, buzzer | |
| 313 | ♠3-659-488-00 | PIN, buzzer holder | |
| 314 | 3-659-521-00 | KNOB, switch; lever slide | |
| 315 | ♠3-659-548-00 | HOLDER, T sensor | |
| 316 | ♠3-659-549-00 | LID BOTTOM, shield case (A) | |
| 317 | ♠3-659-573-00 | BRACKET (UPPER), FS PC board | |
| 318 | 3-659-591-00 | HOLDER, shield case | |
| 319 | 3-659-619-01 | HOLDER, PC board | |
| 320 | ♠3-659-628-00 | BRACKET (LOWER), FS PC board | |
| 321 | ♠3-659-629-00 | BRACKET, cassette-up (left) | |
| 322 | ♠3-659-661-00 | LID, upper, shield case (A) | |
| 323 | ♠3-659-673-00 | FOOT (LEFT), rear | |
| 324 | ♠3-659-681-00 | HOLDER, PC board | |
| 325 | ♠3-659-682-00 | HOLDER, PC board | |
| 326 | ♠3-659-683-00 | LEG, rear (right) | |
| 327 | 3-659-685-00 | HOLDER (B), LED | |
| 328 | 3-659-719-00 | STOPPER, punching M4 screw | |
| 329 | 3-659-762-02 | ARM, ejector static | |
| 330 | ♠3-662-262-00 | HOLDER (D), LED | |
| 331 | 3-662-269-00 | CLOTH, masking switch | |
| 332 | ♠3-662-320-00 | BRACKET, NC-1 | |
| 333 | ♠3-662-332-00 | COVER, SY | |
| 334 | 3-701-777-02 | CAP | |
| 335 | ♠3-703-072-00 | HOLDER, plate; P | |
| 336 | 3-703-075-00 | CAP 2, shaft | |
| 337 | ♠3-703-141-00 | HOLDER, PCB | |
| 338 | ♠4-316-015-01 | HOLDER, wire | |
| 339 | ♠4-857-472-00 | CLAMP | |
| E-301 | 1-543-145-00 | SUPPLY sensor | L9502 |
| E-302 | 1-548-534-00 | TAPE COUNTER | |
| E-303 | 1-552-822-00 | Slide, MEMORY | S9503 |
| E-304 | ♠A-6711-216-A | RF-2 Board, complete | |
| E-305 | ♠A-6711-221-A | NC-1 Board, complete | |
| E-306 | ♠A-6717-140-A | SY-11 Board, complete | |
| E-307 | ♠A-6717-142-A | SY-10 Board, complete | |
| E-308 | ♠A-6717-143-A | SJ-1 Board, complete | |
| E-309 | ♠A-6725-152-A | LS-3 Board, complete | |

## CHASSIS ASSEMBLY (2)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374
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357
360
366
378
377
⊕PSW 3x8
⊕PSW3x8
N3ϕ
⊕PSW3x6
⊕B2.6x4
351
364
361
359
360
373
358
368
372
367
376
⊕BVTT3x8
E-3
375
365
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352
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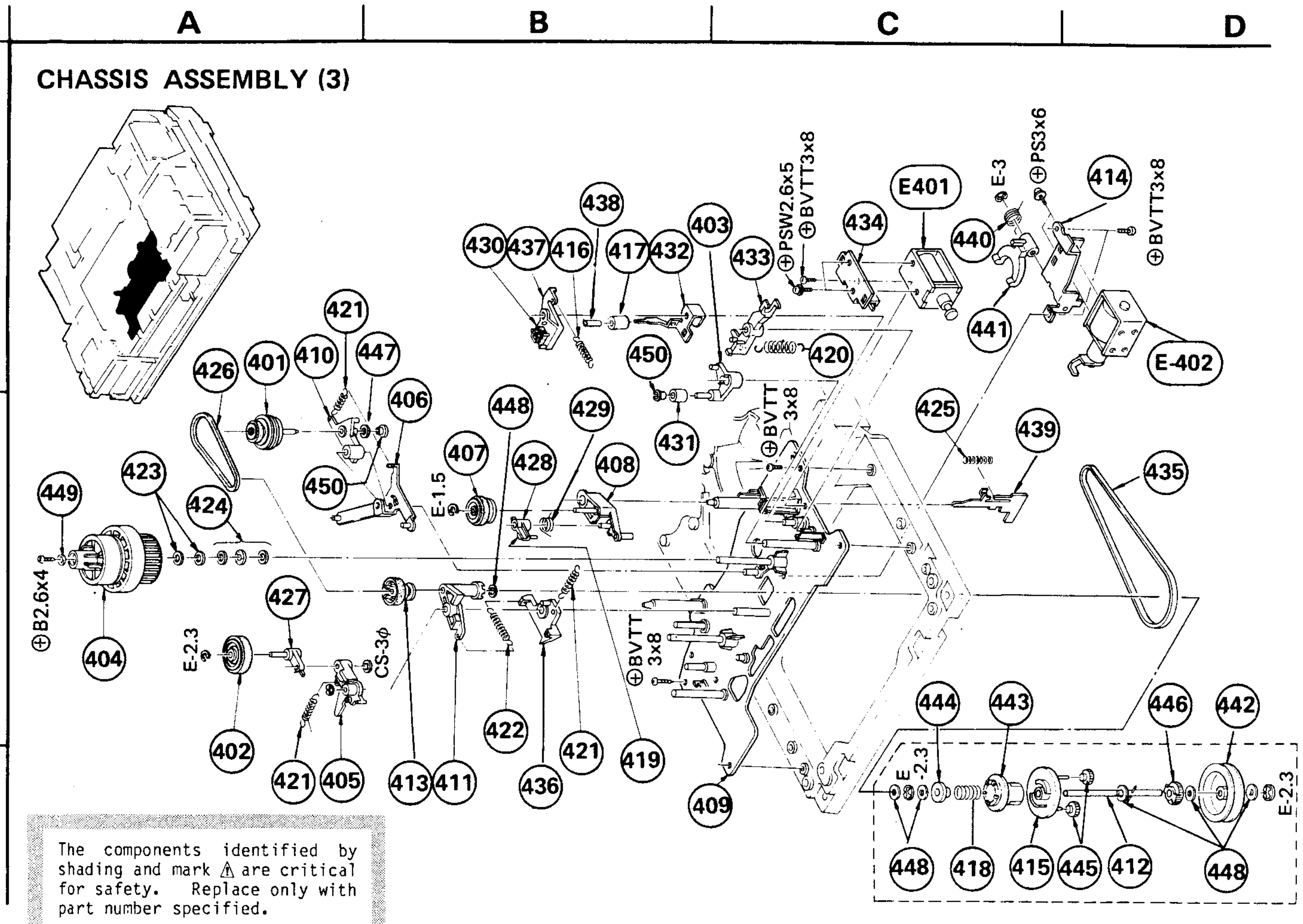
379

| No. | Part No. | Description | Remark |
|---|---|---|---|
| 351 | X-3659-315-0 | REEL ASS'Y, S | |
| 352 | ● X-3659-317-0 | BRACKET ASS'Y, lock | |
| 353 | ● X-3659-322-0 | ARM ASS'Y, ring | |
| 354 | X-3659-323-0 | PLATE ASS'Y, adjustment; R | |
| 355 | X-3659-326-0 | ARM ASS'Y, cassette compartment | |
| 356 | X-3659-328-2 | BAND ASS'Y, tension regulator | |
| 357 | 3-143-060-00 | SPRING, tension | |
| 358 | 3-492-150-00 | SPRING, tension | |
| 359 | 3-532-725-00 | SPRING, tension | |
| 360 | 3-534-217-00 | SPRING, tension | |
| 361 | 3-537-205-00 | SPRING, tension | |
| 362 | 3-646-184-00 | SPACER (T:0.2), reel ADJ | |
| 363 | 3-646-184-11 | SPACER (T:0.1), reel ADJ | |
| 364 | 3-646-185-00 | BEARING, thrust | |
| 365 | 3-648-626-00 | SPRING, tension | |
| 366 | ● 3-659-415-00 | LEVER, press; REW | |
| 367 | ● 3-659-445-00 | BRAKE, S | |
| 368 | 3-659-446-00 | LINING, brake | |
| 369 | 3-659-452-00 | ARM, brake release | |
| 370 | ● 3-659-454-00 | ARM, ring lock | |
| 371 | 3-659-455-00 | SPRING | |
| 372 | ● 3-659-457-00 | PLATE, slide; MS | |
| 373 | ● 3-659-458-00 | DETECTION, cassette | |
| 374 | ● 3-659-562-00 | ARM (1), cassette compartment | |
| 375 | ● 3-659-567-00 | BRAKE, soft | |
| 376 | 3-659-624-00 | LOCK, cassette compartment | |
| 377 | 3-660-916-00 | STOPPER, end | |
| 378 | 3-701-441-21 | WASHER | |
| 379 | 3-703-074-00 | CAP 3, shaft | |

## CHASSIS ASSEMBLY (3)


A
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430
437
416
438
417
432
403
433
⊕PSW2.6x5
⊕BVTT3x8
434
E401
E-3
⊕PS3x6
440
414
⊕BVTT3x8
441
E-402
421
426
401
410
447
406
450
420
448
429
431
⊕BVTT 3x8
425
439
435
449
423
424
407
428
408
450
E-1.5
⊕B2.6x4
404
427
E-2.3
CS-3ϕ
⊕BVTT 3x8
402
421
405
413
411
422
436
421
419
409
444
443
446
442
E-2.3
E-2.3
448
418
415
445
412
448

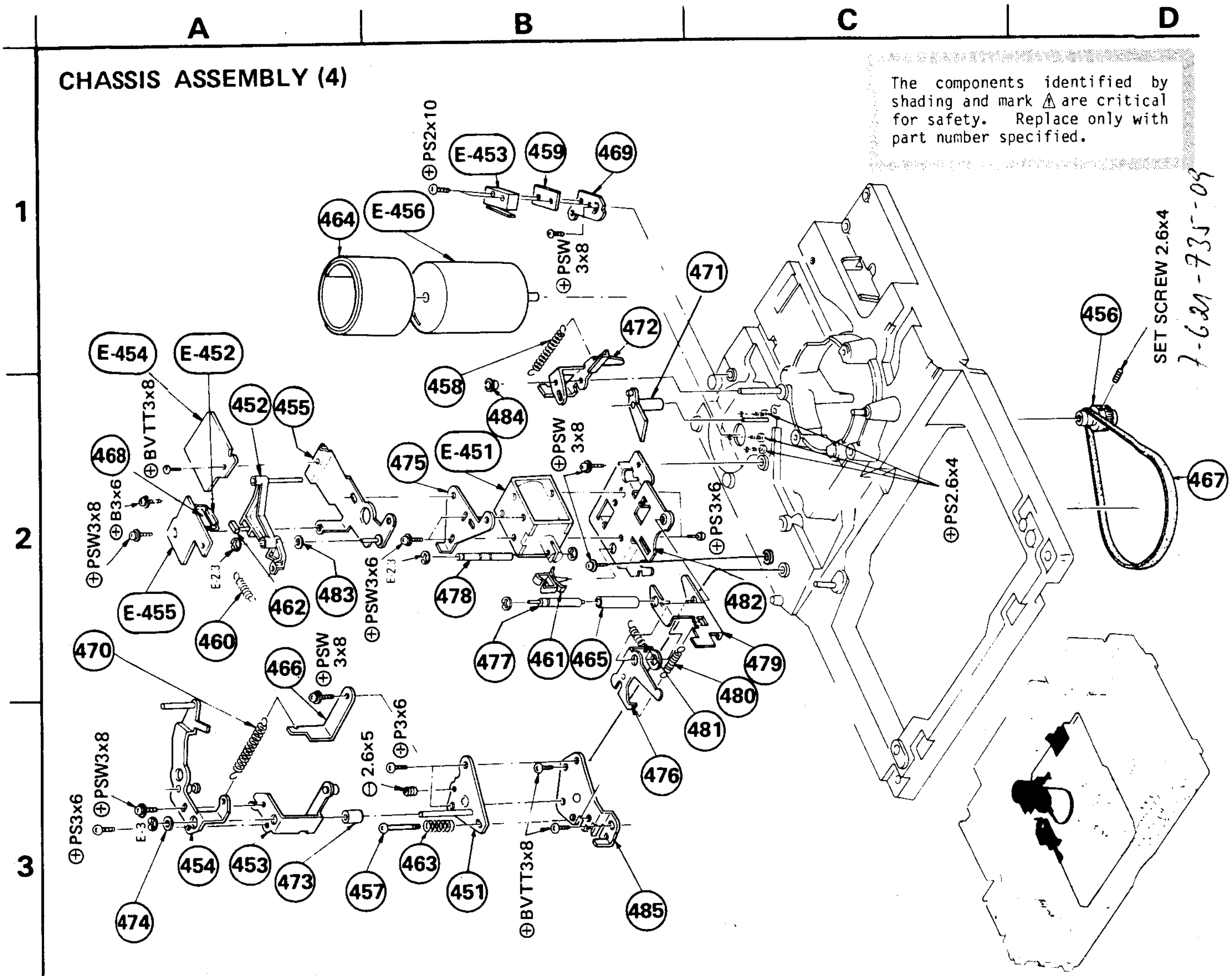
The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

| No. | Part No. | Description | Remark |
|---|---|---|---|
| 401 | X-3653-310-0 | LIMITER ASS'Y, FWD | |
| 402 | X-3653-315-0 | IDLER ASS'Y | |
| 403 | ♠X-3659-311-0 | ARM ASS'Y, TB | |
| 404 | X-3659-316-3 | TABLE ASS'Y, reel; T | |
| 405 | ♠X-3659-318-0 | BRACKET ASS'Y, adjustment | |
| 406 | X-3659-319-0 | LEVER ASS'Y, FWD | |
| 407 | X-3659-324-0 | IDLER ASS'Y, E | |
| 408 | ♠X-3659-325-0 | ARM ASS'Y, E idler | |
| 409 | ♠X-3659-347-4 | CHASSIS ASS'Y, mechanism | |
| 410 | X-3659-410-0 | ARM ASS'Y, FWD | |
| 411 | X-3661-512-0 | ARM ASS'Y, FF | |
| 412 | X-3661-518-0 | SHAFT ASS'Y, midway pulley | |
| 413 | X-3661-520-0 | PULLEY ASS'Y, midway | |
| 414 | ♠X-3661-572-0 | FRAME ASS'Y, SL | |
| 415 | X-3662-207-0 | ARM ASS'Y, planet gear | |
| 416 | 3-534-217-00 | SPRING, tension | |
| 417 | 3-538-051-11 | RUBBER, brake | |
| 418 | 3-543-966-00 | SPRING, compression | |
| 419 | 3-553-038-00 | SPACER, EBF | |
| 420 | 3-632-263-00 | SPRING | |
| 421 | 3-642-483-00 | SPRING, tension | |
| 422 | 3-645-168-00 | SPRING, tension | |
| 423 | 3-646-184-00 | SPACER (T:0.2) | |
| 424 | 3-646-185-00 | BEARING, thrust | |
| 425 | 3-646-312-00 | SPRING | |
| 426 | 3-653-324-00 | BELT, FWD | |
| 427 | ♠3-659-416-00 | LEVER, REW | |
| 428 | ♠3-659-431-00 | CLAW, ratchet | |
| 429 | 3-659-432-00 | SPRING | |
| 430 | 3-659-446-00 | LINING, brake | |
| 431 | 3-659-464-00 | ROLLER, TB arm | |
| 432 | ♠3-659-468-00 | BRAKE, P | |
| 433 | ♠3-659-469-00 | ARM, press; PB | |
| 434 | ♠3-659-470-00 | BASE, PB solenoid | |
| 435 | 3-659-471-00 | BELT, FF | |
| 436 | ♠3-659-564-00 | LEVER ARM, FF press | |
| 437 | ♠3-659-791-00 | BRAKE, T | |
| 438 | ♠3-660-941-00 | RETAINER, brake rubber | |
| 439 | ♠3-660-943-00 | PLATE, erasing protection | |
| 440 | 3-661-570-00 | SPRING | |
| 441 | ♠3-661-574-00 | LEVER, clutch | |
| 442 | 3-662-221-00 | GEAR, mechanism pulley | |
| 443 | 3-662-223-00 | CLUTCH | |
| 444 | 3-662-225-00 | RETAINER, spring | |
| 445 | 3-662-274-00 | GEAR, planet | |
| 446 | 3-662-275-00 | GEAR, driving | |
| 447 | 3-701-437-21 | WASHER | |
| 448 | 3-701-439-21 | WASHER | |
| 449 | 3-701-441-21 | WASHER | |
| 450 | 3-703-075-00 | CAP 2, shaft | |
| ⚠E-401 | 1-454-185-21 | Solenoid, BRAKE | SL9506 |
| ⚠E-402 | 1-454-229-00 | Solenoid, SELECT | SL9507 |

## CHASSIS ASSEMBLY (4)

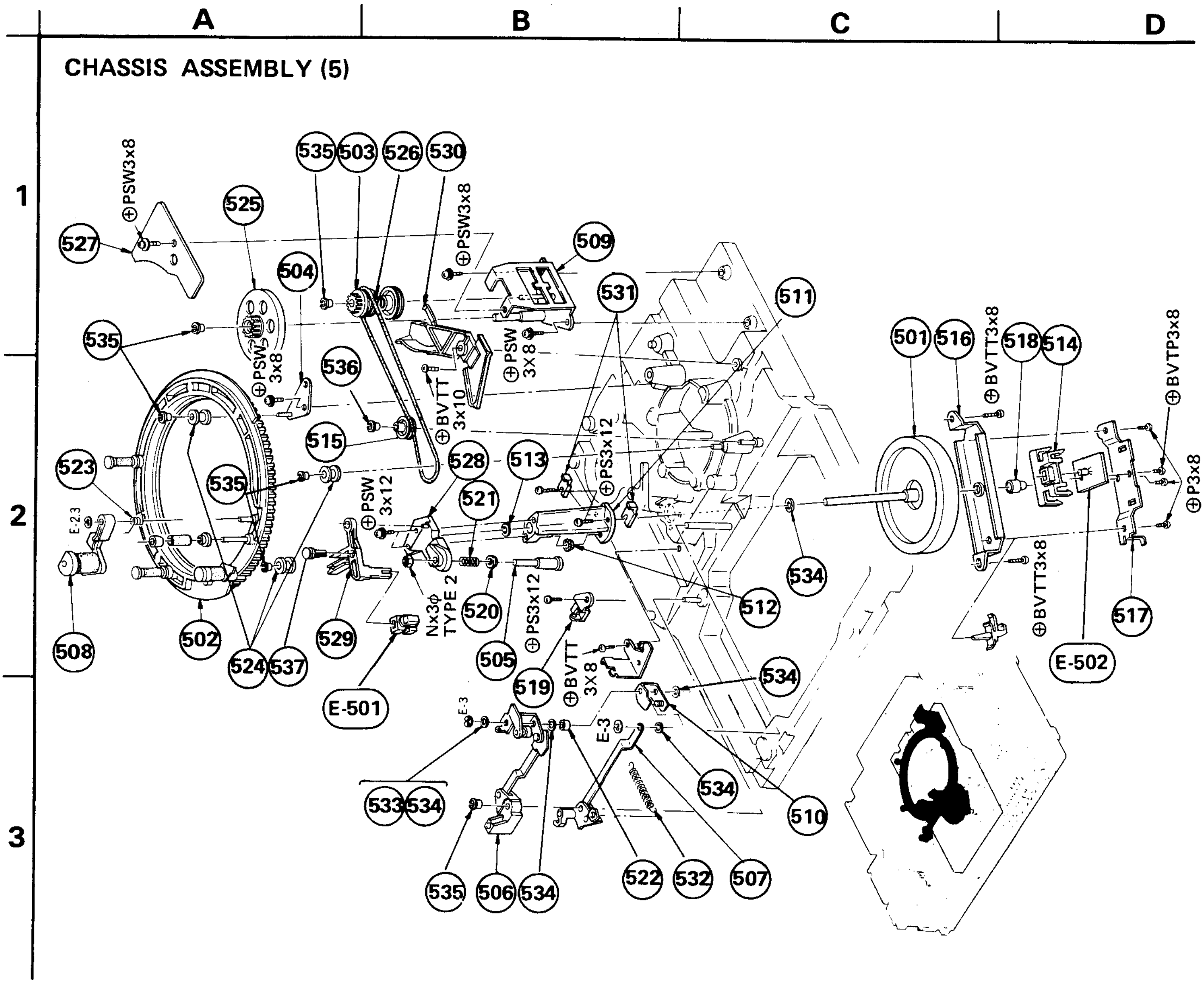
The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

7-620-735-09


A
B
C
D
1
2
3
⊕PS2x10
E-453
459
469
464
E-456
⊕PSW 3x8
471
472
456
SET SCREW 2.6x4
E-454
E-452
⊕BVTT3x8
452
455
458
484
⊕PSW 3x8
468
475
E-451
⊕B3x6
⊕PSW3x8
⊕PS3x6
⊕PS2.6x4
467
E-23
483
478
462
⊕PSW3x6
E-455
460
482
477
461
465
479
470
466
⊕PSW 3x8
⊕P3x6
480
481
⊖2.6x5
⊕PSW3x8
⊕PS3x6
E-3
476
454
453
473
463
457
451
⊕BVTT3x8
474
485

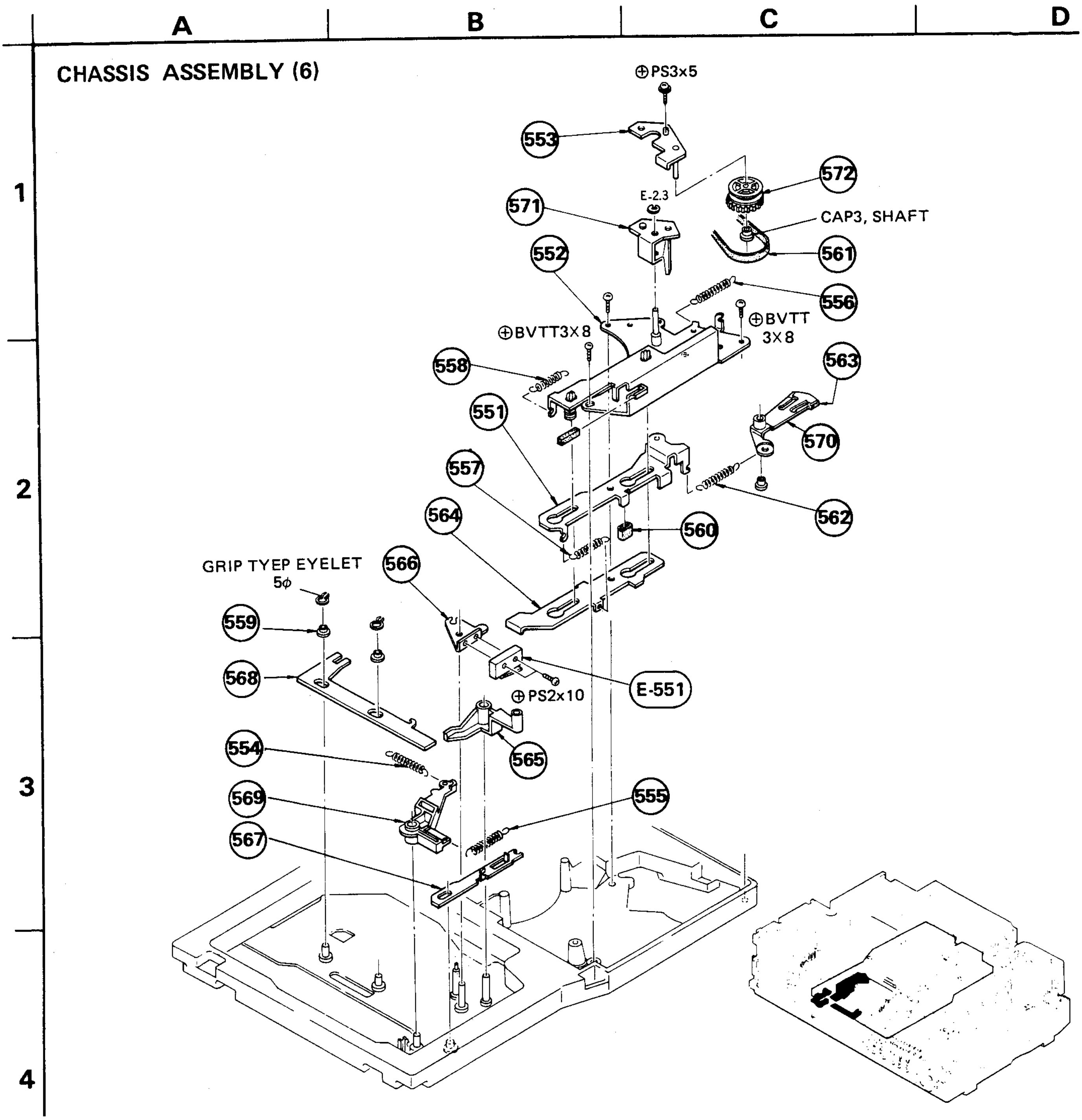
| No. | Part No. | Description | Remark |
|---|---|---|---|
| 451 | ♠X-3659-305-0 | PLATE ASS'Y, adjustment | |
| 452 | X-3659-310-0 | ARM ASS'Y, detection; slack | |
| 453 | ♠X-3659-369-0 | ARM ASS'Y, tension regulator | |
| 454 | ♠X-3659-370-2 | PLATE ASS'Y, arm | |
| 455 | ♠X-3659-380-0 | BASE ASS'Y | |
| 456 | X-3661-524-0 | PULLEY ASS'Y, motor | |
| 457 | ♠3-437-173-02 | SCREW, head adjusting | |
| 458 | 3-533-223-11 | SPRING, tension | |
| 459 | 3-534-263-00 | INSULATOR | |
| 460 | 3-542-476-00 | SPRING, tension | |
| 461 | ♠3-644-407-00 | CLIP, AC wire; E | |
| 462 | 3-646-571-00 | MAGNET | |
| 463 | 3-652-413-00 | SPRING, compression | |
| 464 | ♠3-658-173-00 | SHIELD, capstan | |
| 465 | ♠3-658-194-00 | SPACER (4-25) | |
| 466 | ♠3-659-319-00 | PLATE, adjustment; BT | |
| 467 | 3-659-351-00 | BELT, capstan | |
| 468 | ♠3-659-359-00 | PLATE, boost; reed switch | |
| 469 | ♠3-659-360-00 | BRACKET, threading end; MS | |
| 470 | 3-659-378-02 | SPRING, tension | |
| 471 | ♠3-659-392-00 | ARM, lock keep | |
| 472 | ♠3-659-557-03 | ARM, lock keep | |
| 473 | 3-659-757-00 | SPACER | |
| 474 | 3-659-758-00 | WASHER | |
| 475 | ♠3-659-775-00 | PLATE, adjustment; lever shaft | |
| 476 | ♠3-659-777-00 | LEVER (B), pinch press | |
| 477 | ♠3-659-778-00 | SHAFT, pinch press lever | |
| 478 | ♠3-659-780-00 | PIN, lever; pinch press | |
| 479 | ♠3-659-781-00 | LEVER (A), pinch press | |
| 480 | 3-659-784-00 | SPRING, tension | |
| 481 | 3-659-785-00 | SPRING, tension | |
| 482 | ♠3-659-789-00 | BASE, pinch plunger | |
| 483 | 3-701-439-21 | WASHER | |
| 484 | 3-703-074-00 | CAP3, shaft | |
| 485 | X-3659-312-0 | CHASSIS ASS'Y TENSION REGULATOR | |
| ⚠E-451 | 1-454-217-00 | Solenoid, PINCH | SL9505 |
| E-452 | 1-552-180-00 | REED, SLACK SENSOR | S6201 |
| E-453 | 1-552-665-00 | Miniature, THREADING END | S9502 |
| E-454 | ♠1-601-762-00 | CN-5 Board | |
| E-455 | ♠1-601-763-00 | CN-6 Board | |
| E-456 | 8-838-008-00 | CAPSTAN MOTOR, BHF-1100D | M9502 |

## CHASSIS ASSEMBLY (5)


A
B
C
D
1
2
3
⊕PSW3x8
527
525
535
503
526
530
⊕PSW3x8
509
504
531
511
535
⊕PSW 3x8
536
⊕PSW 3x8
⊕BVTT 3x10
501
516
⊕BVTT3x8
518
514
⊕BVTP3x8
515
⊕PS3x12
523
535
528
513
⊕P3x8
E-23
⊕PSW 3x12
521
534
Nx3ϕ TYPE 2
520
⊕PS3x12
512
⊕BVTT3x8
508
502
524
537
529
505
517
E-502
⊕BVTT 3x8
519
534
E-501
E-3
E-3
534
533
534
510
535
506
534
522
532
507

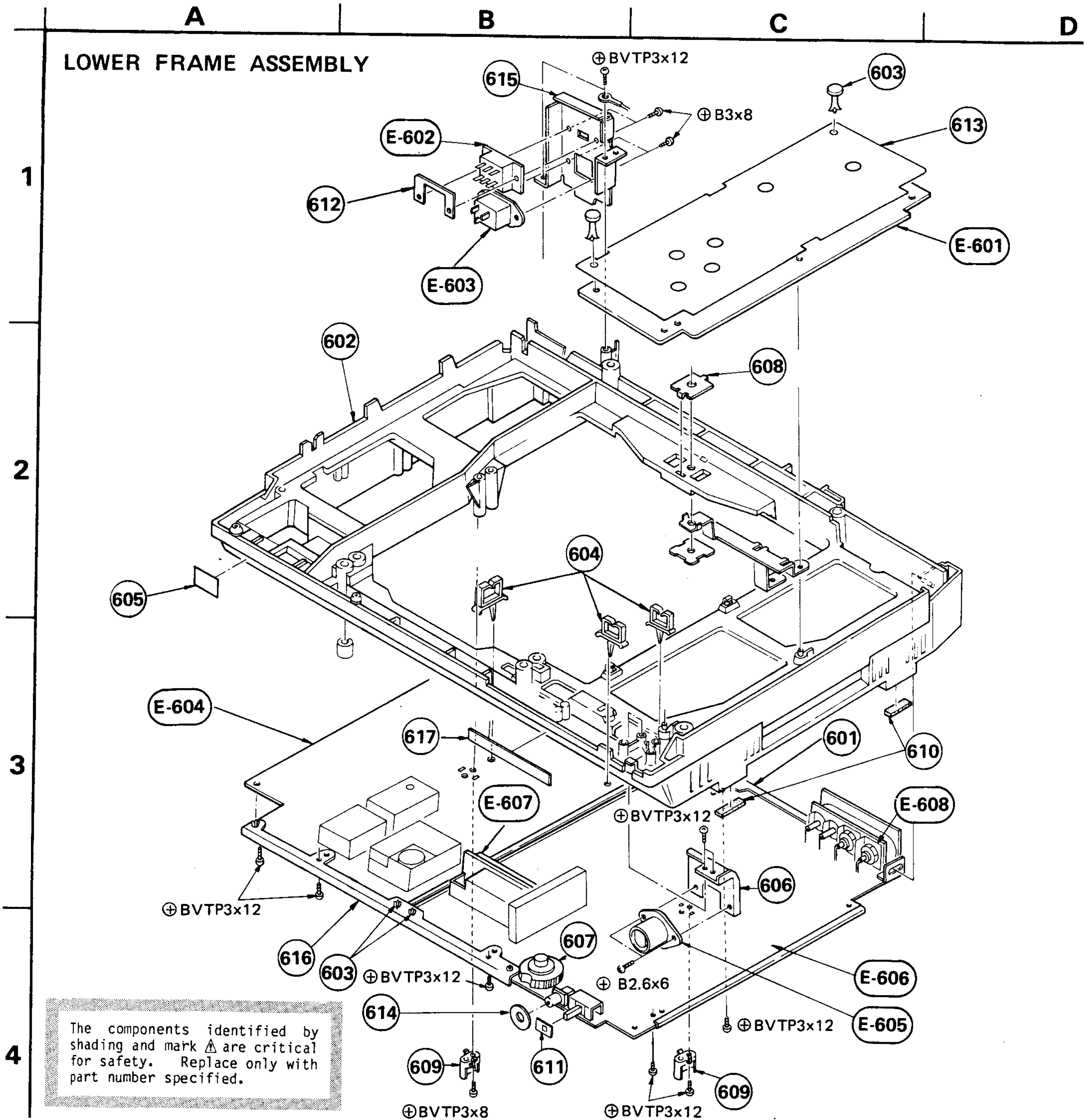
| No. | Part No. | Description | Remark |
|---|---|---|---|
| 501 | A-6735-032-A | CAPSTAN BLOCK ASS'Y | |
| 502 | A-6750-087-A | RING BLOCK ASS'Y, threading | 508, 523 |
| 503 | X-3659-301-0 | LIMITER ASS'Y, E | |
| 504 | ● X-3659-307-0 | SUPPORT ASS'Y, ring roller | |
| 505 | X-3659-308-0 | GUIDE ASS'Y, No. 0 | |
| 506 | X-3659-333-0 | STOPPER ASS'Y, tension regulator | |
| 507 | X-3659-335-5 | LINK ASS'Y (1), release - - - - - - - - 532 | |
| 508 | X-3659-337-0 | ARM ASS'Y, pinch roller | |
| 509 | ● X-3659-340-0 | BRACKET ASS'Y, midway pulley | |
| 510 | X-3659-386-3 | LINK ASS'Y (2), release | |
| 511 | X-3662-201-0 | HOUSING ASS'Y, capstan | |
| 512 | 3-646-182-00 | CAP, oil | |
| 513 | 3-646-183-00 | ABSORBER, capstan oil | |
| 514 | 3-658-161-00 | HOLDER, DME | |
| 515 | 3-659-302-00 | PULLEY, idle | |
| 516 | 3-659-312-00 | RETAINER, capstan | |
| 517 | ● 3-659-313-00 | PLATE, adjustment; DME | |
| 518 | 3-659-314-00 | RETAINER, thrust | |
| 519 | ● 3-659-320-00 | HOOK, spring; release | |
| 520 | 3-659-337-00 | FLANGE No. 0, guide upper | |
| 521 | 3-659-338-00 | SPRING, compression | |
| 522 | 3-659-365-00 | SPACER | |
| 523 | 3-659-388-00 | SPRING | |
| 524 | 3-659-391-00 | ROLLER, ring | |
| 525 | 3-659-396-00 | GEAR (B), midway | |
| 526 | 3-659-397-00 | BELT, eject | |
| 527 | ● 3-659-414-00 | PLATE, control | |
| 528 | 3-659-551-00 | FRAME, guide; No. 0 | |
| 529 | ● 3-659-632-00 | HOLDER, S sensor | |
| 530 | ● 3-659-691-00 | RETAINER (LARGE), harness | |
| 531 | 3-659-759-11 | SPACER, capstan | |
| 532 | 3-660-911-00 | SPRING, tension | |
| 533 | 3-701-441-11 | WASHER | |
| 534 | 3-701-441-21 | WASHER | |
| 535 | 3-703-074-00 | CAP3, shaft | |
| 536 | 3-703-075-00 | CAP2, shaft | |
| 537 | 4-829-039-00 | RIVET, nylon | |
| E-501 | 1-543-145-00 | TAKE-UP sensor | L9501 |
| E-502 | ● 1-600-101-00 | FG-1 Board | |

## CHASSIS ASSEMBLY (6)


A
B
C
D
1
2
3
4
⊕PS3x5
553
572
E-2.3
571
CAP3, SHAFT
552
561
556
⊕BVTT3X8
⊕BVTT 3X8
558
563
551
570
557
564
560
562
GRIP TYEP EYELET 5φ
566
559
568
E-551
⊕PS2x10
554
565
569
555
567

| No. | Part No. | Description | Remark |
|---|---|---|---|
| 551 | ♠ X-3659-303-0 | LEVER (LOWER) ASS'Y, EJECT .... 560 | |
| 552 | ♠ X-3659-359-0 | BASE ASS'Y, threading unit | |
| 553 | ♠ X-3659-360-0 | ARM (B) ASS'Y, gear pulley hold | |
| 554 | 3-143-060-00 | SPRING, tension | |
| 555 | 3-532-125-00 | SPRING, tension | |
| 556 | 3-533-223-00 | SPRING, tension | |
| 557 | 3-642-510-00 | SPRING, tension | |
| 558 | 3-642-513-00 | SPRING, tension | |
| 559 | 3-646-271-00 | BOSS | |
| 560 | 3-655-856-11 | RETAINER, tension regulator | |
| 561 | 3-659-301-00 | BELT, threading | |
| 562 | 3-659-393-00 | SPRING, tension | |
| 563 | 3-659-394-00 | SHOE, brake | |
| 564 | ♠ 3-659-395-00 | LEVER (UPPER), EJECT | |
| 565 | 3-659-453-00 | ARM, EL | |
| 566 | ♠ 3-659-459-00 | BRACKET, CSW | |
| 567 | ♠ 3-659-460-00 | PLATE, release; lock | |
| 568 | ♠ 3-659-461-00 | JOINT | |
| 569 | 3-659-560-00 | ARM, E | |
| 570 | ♠ 3-659-679-00 | ARM, motor brake | |
| 571 | ♠ 3-659-705-00 | ARM (A), gear pulley hold | |
| 572 | 3-659-706-00 | PULLEY, gear | |
| E-551 | 1-552-663-00 | Miniature, CASSETTE IN | S9501 |

## LOWER FRAME ASSEMBLY

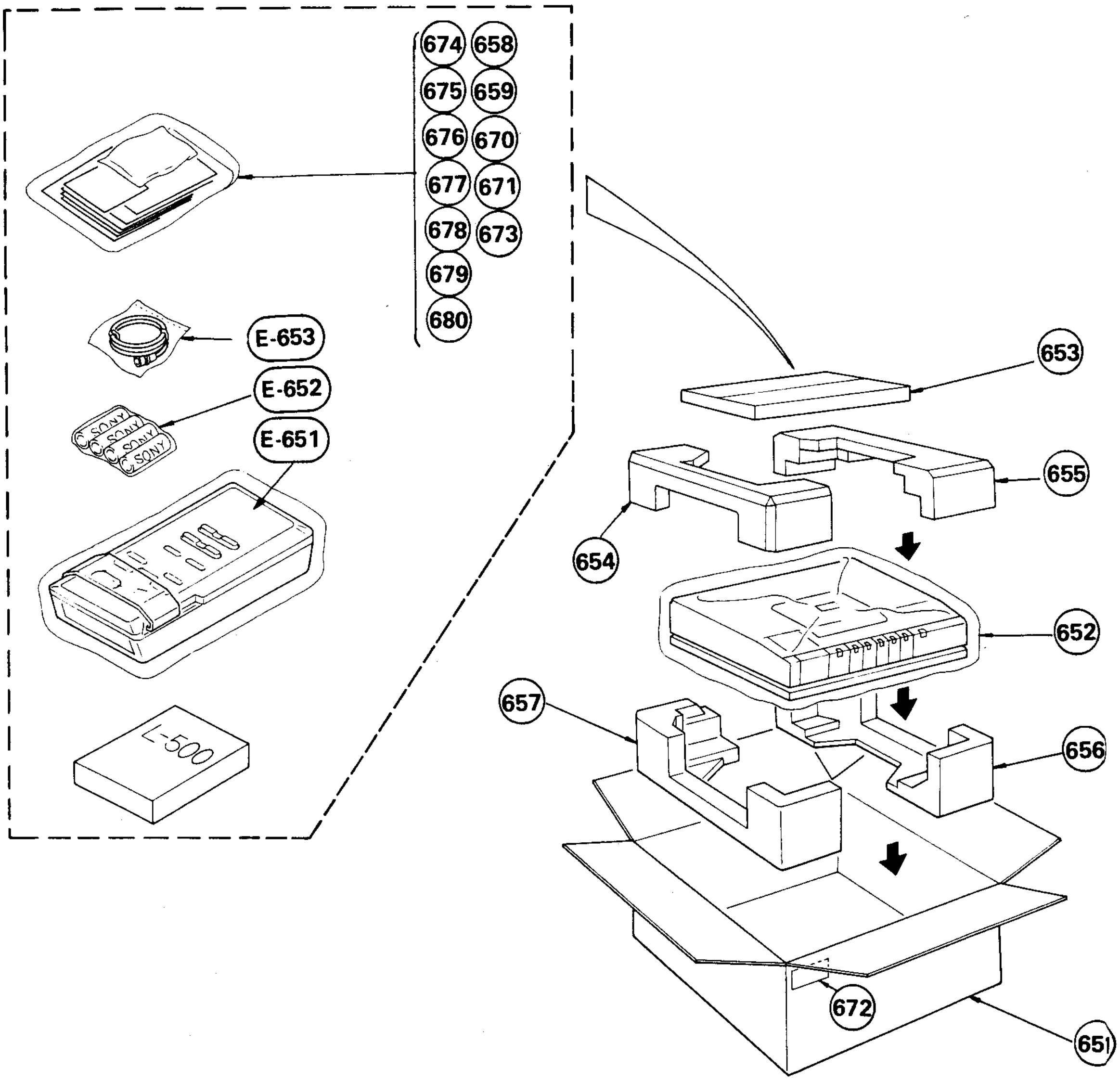

A
B
C
D
1
2
3
4
⊕BVTP3x12
615
603
⊕B3x8
613
E-602
612
E-601
E-603
602
608
604
605
E-604
617
610
601
E-607
⊕BVTP3x12
E-608
606
⊕BVTP3x12
616
603
⊕BVTP3x12
607
⊕B2.6x6
E-606
614
⊕BVTP3x12
E-605
609
611
609
⊕BVTP3x8
⊕BVTP3x12

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

| *No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| 601 | X-3662-208-0 | BRACKET (A) ASS'Y, chassis | |
| 602 | X-3662-211-0 | FRAME ASS'Y, lower ------- 605, 617 | |
| 603 | 3-646-090-00 | RIVET, nylon | |
| 604 | ● 3-655-214-00 | CLIP, cable | |
| 605 | 3-656-344-00 | LABEL, power switch | |
| 606 | ● 3-659-522-00 | BRACKET, camera connector | |
| 607 | 3-659-528-00 | KNOB, track control | |
| 608 | ● 3-659-529-00 | SPACER, plate | |
| 609 | 3-659-530-00 | BLOCK, support; bottom plate | |
| 610 | 3-659-532-00 | FELT, foot | |
| 611 | 3-659-663-00 | COVER, slide switch | |
| 612 | ● 3-662-235-00 | NUT, plate | |
| 613 | ● 3-662-244-00 | INSULATOR | |

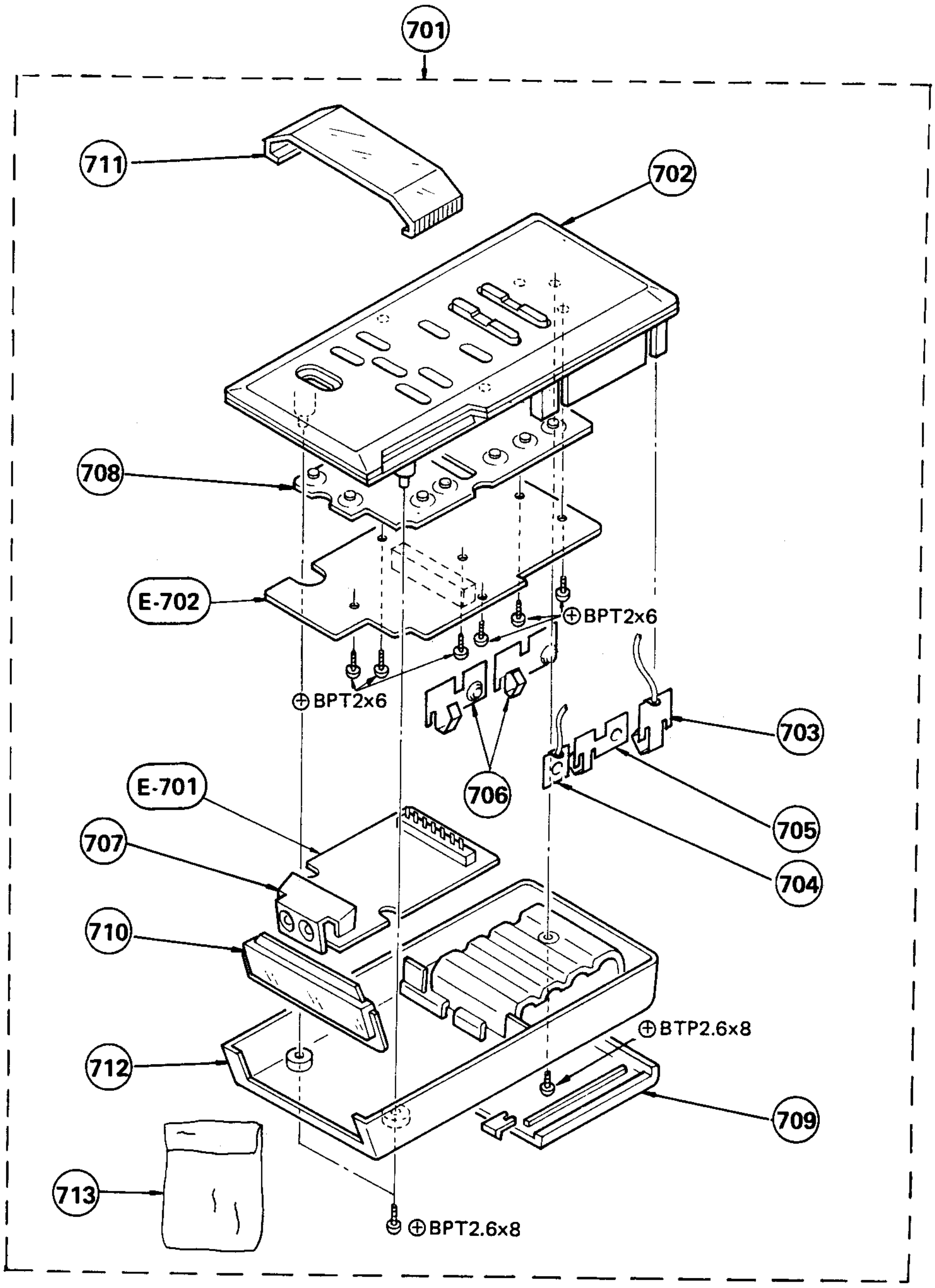
| *No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| 614 | 3-662-261-00 | COVER, microphone jack | |
| 615 | 3-662-273-00 | PANEL (E), power | |
| 616 | ● 3-662-279-00 | BRACKET (B), chassis | |
| 617 | 3-662-280-00 | LABEL, input | |
| E-601 | ● A-6711-217-A | CR-4 Board, complete | |
| ⚠E-602 | 1-553-125-00 | Slide, VOLTAGE SELECTOR | S9505 |
| ⚠E-603 | 1-509-546-00 | 3P INLET | |
| E-604 | ● A-6715-093-A | AS-3 Board, complete | |
| E-605 | ● 1-561-263-00 | CONNECTOR, CAMERA | CN9501 |
| E-606 | ● A-6711-215-A | YC-6 Board, complete | |
| E-607 | ● 1-601-836-00 | CB-1 Board | |
| E-608 | 1-536-614-00 | BOARD, TERMINAL, control panel | CNJ1-4 |

## PACKING



| No. | Part No. | Description | Remark |
|---|---|---|---|
| 651 | X-3662-220-0 | INDIVIDUAL CARTON ASS'Y | |
| 652 | 3-656-390-00 | BAG, protection | |
| 653 | 3-662-327-00 | CASE, accessory | |
| 654 | 3-662-328-00 | CUSHION, left upper | |
| 655 | 3-662-329-00 | CUSHION, right upper | |
| 656 | 3-662-330-00 | CUSHION, right lower | |
| 657 | 3-662-331-00 | CUSHION, left lower | |
| 658 | 3-662-334-01 | LABEL (GERMAN), explanation | |
| 659 | 3-662-335-01 | LABEL (FRENCH), explanation | |
| 670 | 3-662-336-01 | LABEL (DUTCH), explanation | |
| 671 | 3-662-337-01 | LABEL (SWEDISH), explanation | |
| 672 | 3-701-360-00 | LABEL, tack | |
| 673 | 3-701-630-00 | BAG, polyethylene | |
| 674 | 3-783-007-11 | MANUAL, instruction | |
| 675 | 3-794-584-11 | INSTRUCTION | |
| 676 | 3-794-585-11 | MANUAL, instant information | |
| 677 | 3-794-586-11 | MANUAL, instant information | |
| 678 | 3-794-603-11 | MANUAL, instant information | |
| 679 | 3-794-604-11 | MANUAL, instant information | |
| 680 | 3-794-605-11 | MANUAL, instant information | |
| E-651 | A-6701-071-A | COMMANDER ASS'Y, remote; RMT-200 | |
| E-652 | 1-528-027-11 | BATTERY, long-life; SUM-3 | |
| E-653 | 1-551-513-00 | CABLE, coaxial ass'y | |

## COMMANDER BLOCK ASSEMBLY
RMT-200


701
711
702
708
E-702
⊕BPT2x6
⊕BPT2x6
703
706
E-701
705
707
704
710
⊕BTP2.6x8
712
709
713
⊕BPT2.6x8

| No. | Part No. | Description | Remark |
|---|---|---|---|
| 701 | A-6701-071-A | COMMANDER ASS'Y, remote | 702–713, E-701, 702 |
| 702 | X-3662-213-0 | CASE (UPPER) ASS'Y | |
| 703 | 2-249-918-00 | TERMINAL (A), battery | |
| 704 | 2-249-919-00 | TERMINAL (B), battery | |
| 705 | 2-249-920-00 | TERMINAL (C), battery | |
| 706 | 2-249-921-00 | TERMINAL (D), battery | |
| 707 | 2-249-924-00 | REFLECTOR | |
| 708 | 3-662-299-00 | CONTACT, rubber | |
| 709 | 3-662-300-00 | COVER, battery | |
| 710 | 3-662-301-00 | PLATE, frosted | |
| 711 | 3-662-302-00 | COVER, slide | |
| 712 | 3-662-304-00 | CASE (LOWER) | |
| 713 | 3-701-620-00 | BAG, polyethylene | |
| E-701 | ▲1-601-832-00 | RM-1 Board | |
| E-702 | ▲1-601-833-00 | RM-2 Board | |

# SECTION 5
# ELECTRICAL PARTS LIST

**The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.**

- ※ : selected to yield optimum performance.
- Items marked "♠" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

### CAPACITORS

- All capacitors are in μF and ceramic unless otherwise noted. 50WV or less are not indicated except for electrolytics. p : μμF, elect : electrolytic

### RESISTORS

- All resistors are in ohms. Common ¼W carbon resistors are omitted. Refer to the list on page 5-24 for their part numbers.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
  kΩ : 1000Ω, MΩ : 1000kΩ

### COILS

- All coils are microinductors unless ohterwise noted.

## SEMICONDUCTORS

This semiconductor list should be used when ordering the semiconductor (IC, Q, D) for repair parts.

| *Ref. No.* | *For production* | *For repair* |
|---|---|---|
| **AS-3 BOARD** | | |
| IC001 | CX186 | CX186<br>8-751-860-00 |
| IC002 | CX143A | CX143A<br>8-751-430-00 |
| IC003 | TC4011BP<br>MC14011BCP<br>MSM4011 | TC4011BP<br>8-759-240-11 |
| IC004 | TA7120P | TA7120P<br>8-759-271-20 |
| IC005 | TC4011BP<br>MC14011BCP<br>MSM4011 | TC4011BP<br>8-759-240-11 |
| Q001 | 2SA733 | 2SA1027R<br>8-729-612-77 |
| Q002 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q003 | 2SA733 | 2SA1027R<br>8-729-612-77 |
| Q004, 005 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q006 | 2SA733 | 2SA1027R<br>8-729-612-77 |
| Q007, 008 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q009 | 2SA733 | 2SA1027R<br>8-729-612-77 |
| Q010 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q011 | 2SA733 | 2SA1027R<br>8-729-612-77 |
| Q012, 013 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q014~016 | 2SA733 | 2SA1027R<br>8-729-612-77 |
| Q017, 018 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q021 | 2SA733 | 2SA1027R<br>8-729-612-77 |
| Q022 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q023 | 2SA733 | 2SA1027R<br>8-729-612-77 |

| *Ref. No.* | *For production* | *For repair* |
|---|---|---|
| Q024~038 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q039 | 2SA733 | 2SA1027R<br>8-729-612-77 |
| Q040, 041 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q042 | 2SA733 | 2SA1027R<br>8-729-612-77 |
| Q043~047 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q048 | 2SA733 | 2SA1027R<br>8-729-612-77 |
| Q049 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q050 | 2SA733 | 2SA1027R<br>8-729-612-77 |
| Q401, 402 | 2SC1345<br>2SC1361<br>2SC1362 | 2SC1345<br>8-729-334-58 |
| Q403~406 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q407 | 2SC1475<br>2SD774 | 2SC1475<br>8-760-413-10 |
| Q408 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q409 | 2SC945 | 2SC1364<br>8-729-663-47 |
| Q410 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q411, 412 | 2SC1345<br>2SC1361<br>2SC1362 | 2SC1345<br>8-729-334-58 |
| Q414 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q415 | 2SA772<br>2SB733<br>2SB739 | 2SA772<br>8-760-514-10 |

| *Ref. No.* | *For production* | *For repair* |
|---|---|---|
| Q416 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q417 | 2SA772<br>2SB733<br>2SB739 | 2SA772<br>8-760-514-10 |
| Q418 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q419 | 2SA772<br>2SB733<br>2SB739 | 2SA772<br>8-760-514-10 |
| Q420, 421 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q423 | 2SA772<br>2SB733<br>2SB739 | 2SA772<br>8-760-514-10 |
| Q424 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q425 | 2SC1345<br>2SC1361<br>2SC1362 | 2SC1345<br>8-729-334-58 |
| Q427 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| D001~004 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |
| D005 | RD6.2E | RD6.2E<br>8-719-162-07 |
| D006~028<br>D030~032 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |
| D401 | 1T22<br>1T22A | 1T22AM<br>8-719-422-21 |
| D402~406<br>D408~411<br>D413,414,416 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |

## CB-1 BOARD

| | | |
|---|---|---|
| IC7, 8 | SN74LS93N<br>M53293P | SN74LS93N<br>8-759-900-93 |

| *Ref. No.* | *For production* | *For repair* |
|---|---|---|
| IC9 | SN74LS10N | SN74LS10N<br>8-759-900-10 |
| IC10 | SN74LS74AN | SN74LS74AN<br>8-759-900-74 |
| Q63 | 2SC403C | 2SC403C<br>8-724-375-01 |

## CH-3 BOARD

| *Ref. No.* | *For production* | *For repair* |
|---|---|---|
| IC1 | CX-804 | CX804<br>8-758-040-00 |
| IC2 | MC14046BCP<br>CO4046BE | MC14046BCP<br>8-759-040-46 |
| IC3 | CX761 | CX761<br>8-757-610-00 |
| IC4 | CX760 | CX760<br>8-757-600-00 |
| IC5 | μPC78L05A | μPC78L05A<br>8-759-108-05 |
| IC6 | TC4012BP<br>μPD4012C<br>MC140128CP | TC4012BP<br>8-759-240-12 |
| IC7 | TC4011BP<br>μPD4011C<br>MC14011BCP | TC4011BP<br>8-759-240-11 |
| IC8 | TC4011BP<br>MC14011BCP | TC4011BP<br>8-759-240-11 |
| IC9 | BA656 | BA656<br>8-759-965-60 |
| IC10 | TC4011BP<br>μPD4011C<br>MC14011BCP | TC4011BP<br>8-759-240-11 |
| IC11 | TC4012BP<br>μPD4012C<br>MC140128CP | TC4012BP<br>8-759-240-12 |
| IC12 | μPC574J | μPC574J<br>8-759-157-40 |
| Q1 | 2SC945<br>2SC1364<br>2SC403C | 2SC1364<br>8-729-663-47 |
| Q2 | 2SA733<br>2SA844 | 2SA1027R<br>8-729-612-77 |
| Q4 | 2SC945<br>2SC1364<br>2SC403C | 2SC1364<br>8-729-663-47 |

| *Ref. No.* | *For production* | *For repair* |
|---|---|---|
| Q5 | 2N3904 | 2N3904<br>8-729-139-04 |
| Q6 | 2SC403C | 2SC403C<br>8-724-375-01 |
| Q7~10 | 2SA733<br>2SA844 | 2SA1027R<br>8-729-612-77 |
| D2~5<br>D7~10 | 1S1555 | 1S1555<br>8-719-815-55 |
| D11~15 | SR108D<br>SEL1122P | SEL1122P-N<br>8-719-311-23 |
| D16 | TLR123 | TLR123<br>8-719-812-31 |
| D17 | TLY123 | TLY123<br>8-719-812-32 |
| D18 | TLG123 | TLG123<br>8-719-812-33 |
| D19 | TLR123 | TLR123<br>8-719-812-31 |

## CI-1 BOARD

| *Ref. No.* | *For production* | *For repair* |
|---|---|---|
| IC013 | SN29764N | SN29764N<br>8-759-997-64 |
| D020 | TLR326 | TLR326<br>8-719-803-26 |

## CR-4 BOARD

| *Ref. No.* | *For production* | *For repair* |
|---|---|---|
| IC1 | TC4027BP | TC4027BP<br>8-759-240-27 |
| IC2 | CX150 | CX150<br>8-751-500-00 |
| IC3 | TA7320BP | TA7320P<br>8-759-213-20 |
| IC4 | TC4528BP | TC4528BP<br>8-759-245-28 |
| IC5 | CX130 | CX130<br>8-751-300-00 |
| Q1, 4 | 2SC403C | 2SC403C<br>8-724-375-01 |
| Q5 | 2SA733<br>2SA844<br>2SA925 | 2SA1027<br>8-729-612-77 |

| *Ref. No.* | *For production* | *For repair* |
|---|---|---|
| Q6, 8~13 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q15 | 2SC535 | 2SC535<br>8-729-353-52 |
| Q16, 17 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q18 | 2SA733<br>2SA844<br>2SA925 | 2SA1027R<br>8-729-612-77 |
| Q19, 20 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q21~23 | 2SC535 | 2SC535<br>8-729-353-52 |
| D3, 5~8 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |
| D9 | RD5.6E-B | RD5.6E-B2Z<br>8-719-156-25 |
| D10~16 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |
| D18 | 1S1555 | 1S1555<br>8-719-815-55 |
| **FG-1 BOARD** | | |
| DM701 | DM101A | DM101A-1<br>8-749-011-01 |
| **IF-10 BOARD** | | |
| IC501 | TBA1440G | TBA1440G<br>8-759-014-40 |
| IC502 | M5135P | M5135P<br>8-759-651-35 |
| IC503 | TBA120U | TBA120UB<br>8-759-001-20 |
| Q501 | 2SC2009 | 2SC2009<br>8-765-300-00 |
| Q502, 503 | 2SC945<br>2SC1364 | 2SC1364<br>8-729-663-47 |

| *Ref. No.* | *For production* | *For repair* |
|---|---|---|
| **IR-1 BOARD** | | |
| Q901 | 2SK23A | 2SK23A<br>8-722-384-00 |
| Q902 | 2SC1363<br>2SC1364<br>2SC945 | 2SC1364<br>8-729-663-47 |
| Q903 | 2SA678 | 2SA1027R<br>8-729-612-77 |
| D901 | PH302A | PH302A<br>8-719-100-33 |
| **LS-3 BOARD** | | |
| Q501 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q502 | 2SA733 | 2SA1027R<br>8-729-612-77 |
| Q503 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q504 | 2SC1761 | 2SC1761<br>8-763-113-00 |
| Q505~507 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q508 | 2SA733 | 2SA1027R<br>8-729-612-77 |
| Q509 | 2SC1061 | 2SC1061<br>8-729-316-12 |
| Q510, 511 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q512 | 2SC1761 | 2SC1761<br>8-763-113-00 |
| D501 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |
| D502 | 10E2<br>V06C | 10E2<br>8-719-200-02 |

| Ref. No. | For production | For repair |
|---|---|---|
| **NC-1 BOARD** | | |
| IC1 | CX135 | CX135<br>8-751-350-00 |
| Q1, 2 | 2SA844 | 2SA844<br>8-729-384-48 |
| Q3, 4 | 2SC403C | 2SC403C<br>8-724-375-01 |
| D1, 2 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |
| **PC-1 BOARD** | | |
| Q1, 2 | 2SC1363<br>2SC1364<br>2SC945 | 2SC1364<br>8-729-663-47 |
| Q11 | 2SA772<br>2SB733<br>2SB739 | 2SA772<br>8-760-514-10 |
| Q12~14 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| D1 | RD6.2E | RD6.2E<br>8-719-162-07 |
| **PL-2 BOARD** | | |
| Q602 | 2SC2315<br>2SC2315S | 2SC2315<br>8-729-331-53 |
| Q603 | 2SC1474<br>2SD773 | 2SC1474<br>8-760-335-10 |
| Q605 | 2SC2315<br>2SC2315S | 2SC2315<br>8-729-331-53 |
| Q606 | 2SC1474<br>2SD773 | 2SC1474<br>8-760-335-10 |
| Q608 | 2SC2315<br>2SC2315S | 2SC2315<br>8-729-331-53 |
| Q609, 610 | 2SC1474<br>2SD773 | 2SC1474<br>8-760-335-10 |
| Q613 | 2SC2315<br>2SC2315S | 2SC2315<br>8-729-331-53 |
| Q614 | 2SC1364 | 2SC1364<br>8-729-663-47 |
| D601~612 | 10E2<br>V06C | 10E2<br>8-719-200-02 |
| **RF-2 BOARD** | | |
| IC1 | CX134A | CX134A<br>8-751-340-00 |
| Q1, 2 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q3, 4 | 2SK152 | 2SK152<br>8-765-422-00 |
| Q5~7 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q8 | 2SC403C | 2SC403C<br>8-724-375-01 |
| Q9 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q10 | 2SA925<br>2SA844 | 2SA844<br>8-729-384-48 |
| Q11 | 2SA733 | 2SA1027R<br>8-729-612-77 |
| Q12 | 2SC1815 | 2SC1364<br>8-729-663-47 |
| Q13 | 2SC403C | 2SC403C<br>8-724-375-01 |
| D1~9 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |
| **RM-1 BOARD** | | |
| IC801 | M50112P | M50112P<br>8-759-601-12 |
| Q801, 802 | 2SC1363<br>2SC1364<br>2SC945 | 2SC1364<br>8-729-663-47 |
| D801, 802 | SE303A | SE303A<br>8-719-103-03 |

| *Ref. No.* | *For production* | *For repair* |
|---|---|---|
| D803 | TLR124 | TLR124<br>8-719-812-41 |
| **SJ-1 BOARD** | | |
| IC701~704 | TC4011BP<br>MC14011BCP | TC4011BP<br>8-759-240-11 |
| IC705 | TC4001BP<br>MC14001BCP | TC4001BP<br>8-759-240-01 |
| IC706, 707 | TC4049BP | TC4049BP<br>8-759-240-49 |
| Q701 | 2SA733 | 2SA1027R<br>8-729-612-77 |
| Q702~705 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| D701~712 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |
| **SR-08 BOARD** | | |
| ⚠ IC1 | TL494CN | TL494CN<br>8-759-904-94 |
| ⚠Q101, 102 | 2SC2335 | Pair Transistor kit<br>(2SC2335)<br>A-6738-159-A |
| ⚠Q201 | 2SA733 | 2SA1027R<br>8-729-612-77 |
| ⚠Q202, 203 | 2SC1816 | 2SC1816<br>8-764-803-00 |
| ⚠Q204 | 2SC945 | 2SC1364<br>8-729-663-47 |
| ⚠Q205, 206 | 2SC1475 | 2SC1475<br>8-760-413-10 |
| ⚠Q207 | 2SC945 | 2SC1364<br>8-729-663-47 |
| ⚠D101~104 | ERC04-06S | U05G<br>8-719-911-55 |
| ⚠D201, 202 | ERD33-02 | ERD33-02<br>8-719-933-02 |
| ⚠D203~205 | 1S2076A | 1S1585<br>8-719-815-85 |
| ⚠D206, 207 | 10E1 | 10E2<br>8-719-200-02 |
| ⚠D208 | RD20E-B | EQB01-18<br>8-719-931-18 |
| ⚠D209 | RD5.6E-B3Z | RD5.6E-B2Z<br>8-719-156-25 |
| ⚠D210 | 1S2076A | 1S1585<br>8-719-815-85 |
| ⚠D211 | RD15E-B | EQB01-15<br>8-719-931-15 |
| ⚠D212 | 1S2076A | 1S1585<br>8-719-815-85 |
| **SY-10 BOARD** | | |
| IC1 | TC4011BP<br>MSM4011<br>MC14011BCP | TC4011BP<br>8-759-240-11 |
| IC2 | μPD547C060 | μPD547C060<br>8-759-147-60 |
| IC3 | TC4081BP<br>μPD4081C<br>MSM4081 | TC4081BP<br>8-759-240-81 |
| Q1~4 | 2SC1363<br>2SC1364<br>2SC945 | 2SC1364<br>8-729-663-47 |
| Q5 | 2SC403C | 2SC403C<br>8-724-375-01 |
| Q6, 7 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| D1~14 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |
| D15~22 | TLR123 | TLR123<br>8-719-812-31 |
| D23 | RD11E | RD11E-B<br>8-719-111-07 |
| D24 | RD7.5E | EQB01-08<br>8-719-931-08 |
| D25, 26 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |

## SY-11 BOARD

| *Ref. No.* | *For production* | *For repair* |
|---|---|---|
| IC1 | TC4066BP<br>μPD4066C<br>MSM4066 | TC4066BP<br>8-759-240-66 |
| IC2, 3 | TC4069UBP<br>CD4069UBE<br>μPD4069C<br>MC14069BCP | μPD4069C<br>8-759-140-69 |
| IC4 | TC4001BP<br>MC14001BCP<br>MSM4001 | TC4001BP<br>8-759-240-01 |
| IC5 | TC4069UBP<br>CD4069UBE<br>μPD4069C<br>MC14069BCP | μPD4069C<br>8-759-140-69 |
| IC6 | μPD546C107 | μPD546C107<br>8-759-146-17 |
| IC7 | μPD547C049 | μPD547C049<br>8-759-147-49 |
| IC8, 9 | BX342 | BX342<br>8-743-420-00 |
| Q1, 2 | 2SC1363<br>2SC1364<br>2SC945 | 2SC1364<br>8-729-663-47 |
| Q3~6 | 2SA677<br>2SA678 | 2SA1027R<br>8-729-612-77 |
| Q8 | 2SC2315<br>2SC2315S | 2SC2315<br>8-729-331-53 |
| Q9 | 2SC1124 | 2SC1124<br>8-725-412-00 |
| Q10 | 2SC1474 | 2SC1474<br>8-760-335-10 |
| Q11, 12 | 2SA722<br>2SB733 | 2SA772<br>8-760-514-10 |
| Q13~15,<br>Q17~19 | 2SA677<br>2SA678 | 2SA1027R<br>8-729-612-77 |
| Q20~23 | 2SC1363<br>2SC1364<br>2SC945 | 2SC1364<br>8-729-663-47 |
| Q24 | 2SC1474 | 2SC1474<br>8-760-335-10 |
| Q25~27 | 2SC1363<br>2SC1364<br>2SC945 | 2SC1364<br>8-729-663-47 |
| D1, 2 | 10E2 | 10E2<br>8-719-200-02 |
| D3~5 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |
| D6 | RD7.5E | EQB01-08<br>8-719-931-08 |
| D7~13 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |
| D14 | 10E2 | 10E2<br>8-719-200-02 |
| D15, 16 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |
| D18 | RD11E | RD11E-B<br>8-719-111-07 |
| D19~30 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |

## TM-10 BOARD

| *Ref. No.* | *For production* | *For repair* |
|---|---|---|
| IC001 | MB8841-180 | MB8841-180<br>8-759-981-80 |
| IC002, 003 | μPA56C | μPA56C<br>8-759-100-56 |
| IC004, 005 | M54519P | M54519P<br>8-759-645-19 |
| IC006 | M58478P | M58478P<br>8-759-684-78 |
| IC007 | TC4081BP<br>MC14081BCP | TC4081BP<br>8-759-240-81 |
| IC008 | TC4071BP<br>MC14071BCP | TC4071BP<br>8-759-240-71 |
| IC009 | TC4069UBP<br>MC14069BCP | MSM4069<br>8-759-904-69 |
| Q001 | 2SA773 | 2SA684<br>8-729-468-43 |
| Q002 | 2SA733<br>2SA844 | 2SA1027R<br>8-729-612-77 |
| Q003 | 2SC945<br>2SC1363 | 2SC1364<br>8-729-663-47 |

| *Ref. No.* | *For production* | *For repair* |
|---|---|---|
| Q004 | 2SA733<br>2SA844 | 2SA1027R<br>8-729-612-77 |
| D001, 002,<br>004, 006 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |
| D007 | RD24E | RD24E-B<br>8-719-124-07 |
| D008,<br>011~014,<br>017~020 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |
| D021 | RD3.9E | RD3.9E<br>8-719-139-07 |
| D022~027 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |
| D051~064 | TLR124 | TLR124<br>8-719-812-41 |
| DB001~005 | μPA54H | μPA54H<br>8-759-100-54 |
| **TM-11 BOARD** | | |
| IC101 | μPC78L05A | μPC78L05A<br>8-759-108-05 |
| Q101 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q102 | 2SD773 | 2SD773<br>8-729-177-32 |
| D101 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |
| D102 | RD9.1E | RD9.1E-B<br>8-719-191-07 |
| D103 | 10E2<br>V06C | 10E2<br>8-719-200-02 |
| D104 | 1SS82 | 1SS83<br>8-719-901-83 |
| D105 | RD5.1E | RD5.1E-B<br>8-719-151-07 |
| D106~108 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |

| *Ref. No.* | *For production* | *For repair* |
|---|---|---|
| **TM-12 BOARD** | | |
| LED201 | TLG114<br>TLG114A | TLG114<br>8-719-801-14 |
| LED202 | TLR114 | TLR114<br>8-719-811-41 |
| Q201 | 2SC945 | 2SC1364<br>8-729-663-47 |
| Q202 | 2SA733 | 2SA1027R<br>8-729-612-77 |
| D201 | 1S1555 | 1S1555<br>8-719-815-55 |
| **TU-11 BOARD** | | |
| Q101 | 2SC2009 | 2SC2009<br>8-765-300-00 |
| Q102 | 2SC403C | 2SC403C<br>8-724-375-01 |
| Q103 | 2SA733 | 2SA1027R<br>8-729-612-77 |
| Q104 | 2SC1364<br>2SC945 | 2SC1364<br>8-729-663-47 |
| Q106 | 2SC1475<br>2SD789 | 2SC1475<br>8-760-413-10 |
| Q108 | 2SC1364<br>2SC945 | 2SC1364<br>8-729-663-47 |
| D101, 102 | 1S2076A | 1S1585<br>8-719-815-85 |
| D103 | RD27E | RD27E-B2Z<br>8-719-127-25 |
| D104 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |
| **YC-6 BOARD** | | |
| IC1 | CX187 | CX187<br>8-751-870-00 |
| IC2 | CX136A | CX136A<br>8-751-360-00 |
| IC3 | CX150 | CX150<br>8-751-500-00 |

| *Ref. No.* | *For production* | *For repair* |
|---|---|---|
| IC4 | CX130 | CX130<br>8-751-300-00 |
| IC5 | CX145 | CX145<br>8-751-450-00 |
| IC6 | CX832 | CX832<br>8-758-320-00 |
| IC11 | CX130 | CX130<br>8-751-300-00 |
| IC12 | M58478P | M58478P<br>8-759-684-78 |
| IC13 | TC4069UBP<br>MSM4069 | MSM4069<br>8-759-904-69 |
| Q1, 2 | 2SC403C | 2SC403C<br>8-724-375-01 |
| Q3~5 | 2SA844 | 2SA844<br>8-729-384-48 |
| Q6 | 2SC403C | 2SC403C<br>8-724-375-01 |
| Q7 | 2SC945 | 2SC1364<br>8-729-663-47 |
| Q8 | 2SA844 | 2SA844<br>8-729-384-48 |
| Q9~11 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q12, 13 | 2SA733<br>2SA844<br>2SA925 | 2SA1027R<br>8-729-612-77 |
| Q14~17 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q18 | 2SC403C | 2SC403C<br>8-724-375-01 |
| Q19 | 2SA844 | 2SA844<br>8-729-384-48 |
| Q20, 21 | 2SC403C | 2SC403C<br>8-724-375-01 |
| Q22 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q24 | 2SA844 | 2SA844<br>8-729-384-48 |

| *Ref. No.* | *For production* | *For repair* |
|---|---|---|
| Q25 | 25C945 | 2SC1364<br>8-729-663-47 |
| Q26, 27 | 2SC403C | 2SC403C<br>8-724-375-01 |
| Q28 | 2SA733<br>2SA844<br>2SA925 | 2SA1027R<br>8-729-612-77 |
| Q29 | 2SA844 | 2SA844<br>8-729-384-48 |
| Q30~32 | 2SC403C | 2SC403C<br>8-724-375-01 |
| Q33 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q34 | 2SC403C | 2SC403C<br>8-724-375-01 |
| Q35, 36 | 2SA733<br>2SA844<br>2SA925 | 2SA1027R<br>8-729-612-77 |
| Q37 | 2SC403C | 2SC403C<br>8-724-375-01 |
| Q38 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q40~43 | 2SC403C | 2SC403C<br>8-724-375-01 |
| Q44~48 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q49~53 | 2SC403C | 2SC403C<br>8-724-375-01 |
| Q54 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q55~57 | 2SC403C | 2SC403C<br>8-724-375-01 |
| Q58 | 2SC945 | 2SC1364<br>8-729-663-47 |
| Q59~62 | 2SA844<br>2SA733 | 2SA844<br>8-729-384-48 |
| Q64 | 2SC1474<br>2SC2001 | 2SC2001<br>8-729-100-13 |
| Q65 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |

| *Ref. No.* | *For production* | *For repair* |
|---|---|---|
| Q66, 67 | 2SC403C | 2SC403C<br>8-724-375-01 |
| Q68, 69 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q70 | 2SA733<br>2SA844<br>2SA925 | 2SA1027R<br>8-729-612-77 |
| Q71, 72, 77, 78 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q79 | 2SC403C | 2SC403C<br>8-724-375-01 |
| Q80, 81 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q82 | 2SC403C | 2SC403C<br>8-724-375-01 |
| Q83 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q84~86 | 2SC403C | 2SC403C<br>8-724-375-01 |
| Q87 | 2SA844 | 2SA844<br>8-729-384-48 |
| Q95 | 2SC945<br>2SC1363<br>2SC1364 | 2SC1364<br>8-729-663-47 |
| Q96 | 2SC403C | 2SC403C<br>8-724-375-01 |
| Q97 | 2SC945 | 2SC1364<br>8-729-663-47 |
| D1~3 | 1S1555 | 1S1555<br>8-719-815-55 |
| D5, 7 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |
| D8~13 | 1S1555 | 1S1555<br>8-719-815-55 |
| D14~23, 25~29, 33~36 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |

| *Ref. No.* | *For production* | *For repair* |
|---|---|---|
| D37 | RD6.2E | RD6.2E<br>8-719-162-07 |
| D40, 41, 44, 45 | 1S1555<br>1S2076<br>1S2473 | 1S1555<br>8-719-815-55 |

## AS-3 BOARD

| Ref.No. | Part No. | Description | | | Remark |
|---|---|---|---|---|---|
| ♦ | A-6715-093-A | AS-3 Board, complete | | | E-604 |
| C001 | 1-101-006-00 | 0.047 | | | |
| C002 | 1-123-316-00 | 10 | 16V | elect | |
| C003, 004 | 1-108-587-00 | 0.022 | | mylar | |
| C005 | 1-108-595-00 | 0.047 | | mylar | |
| C006 | 1-101-001-00 | 0.001 | | | |
| C007 | 1-101-006-00 | 0.047 | | | |
| C008, 009 | 1-131-369-00 | 4.7 | 16V | tantalum | |
| C010 | 1-101-006-00 | 0.047 | | | |
| C011 | 1-131-345-00 | 0.47 | 35V | tantalum | |
| C012 | 1-123-305-00 | 33 | 10V | elect | |
| C013, 014 | 1-130-200-00 | 0.047 | | film | |
| C015 | 1-102-115-00 | 560p | | | |
| C016 | 1-130-200-00 | 0.047 | | film | |
| C017 | 1-130-199-00 | 0.01 | | film | |
| C018 | 1-101-006-00 | 0.047 | | | |
| C019 | 1-131-371-00 | 10 | 16V | tantalum | |
| C020, 021 | 1-131-361-00 | 2.2 | 20V | tantalum | |
| C022 | 1-131-371-00 | 10 | 16V | tantalum | |
| C023 | 1-101-006-00 | 0.047 | | | |
| C024 | 1-131-346-00 | 0.68 | 35V | tantalum | |
| C025 | 1-101-001-00 | 0.001 | | | |
| C026 | 1-130-201-00 | 0.068 | | polypropylen | |
| C027 | 1-101-001-00 | 0.001 | | | |
| C028 | 1-130-535-00 | 0.15 | | polypropylene | |
| C029 | 1-123-351-00 | 0.47 | 50V | elect | |
| C030 | 1-101-006-00 | 0.047 | | | |
| C031 | 1-123-320-00 | 100 | 16V | elect | |
| C032 | 1-101-004-00 | 0.01 | | | |
| C033 | 1-161-025-00 | 0.1 | | | |
| C034, 035 | 1-131-345-00 | 0.47 | 35V | tantalum | |
| C036 | 1-101-001-00 | 0.001 | | | |
| C037 | 1-123-352-00 | 1 | 50V | elect | |
| C038 | 1-123-351-00 | 0.47 | 50V | elect | |
| C039 | 1-101-003-00 | 0.0047 | | | |
| C040 | 1-123-351-00 | 0.47 | 50V | elect | |
| C041 | 1-131-344-00 | 0.33 | 35V | tantalum | |
| C042 | 1-101-006-00 | 0.047 | | | |
| C043 | 1-131-347-00 | 1 | 35V | tantalum | |
| C044 | 1-123-328-00 | 4.7 | 25V | elect | |
| C045, 046 | 1-131-369-00 | 4.7 | 16V | tantalum | |
| C047 | 1-101-006-00 | 0.047 | | | |
| C048 | 1-123-320-00 | 100 | 16V | elect | |
| C049 | 1-108-595-00 | 0.047 | | mylar | |
| C050 | 1-108-555-00 | 0.001 | | mylar | |
| C051 | 1-123-320-00 | 100 | 16V | elect | |
| C052 | 1-131-343-00 | 0.22 | 35V | tantalum | |
| C053, 054 | 1-123-317-00 | 22 | 16V | elect | |
| C055 | 1-123-307-00 | 100 | 10V | elect | |
| C056, 057 | 1-102-106-00 | 100p | | | |
| C058 | 1-123-320-00 | 100 | 16V | elect | |
| C059 | 1-101-004-00 | 0.01 | | | |
| C060 | 1-161-016-00 | 0.018 | | | |
| C061 | 1-123-316-00 | 10 | 16V | elect | |
| C062 | 1-102-963-00 | 33p | | | |
| C063 | 1-123-298-00 | 470 | 6.3V | elect | |
| C064 | 1-123-316-00 | 10 | 16V | elect | |
| C065 | 1-123-296-00 | 220 | 6.3V | elect | |
| C066 | 1-123-316-00 | 10 | 16V | elect | |
| C067 | 1-123-319-00 | 47 | 16V | elect | |
| C068 | 1-123-316-00 | 10 | 16V | elect | |
| C069, 070 | 1-131-354-00 | 1.5 | 25V | tantalum | |
| C071, 072 | 1-161-017-00 | 0.022 | | | |
| C073 | 1-161-021-00 | 0.047 | | | |
| C074 | 1-131-343-00 | 0.22 | 35V | elect | |
| C075 | 1-131-341-00 | 0.1 | 35V | tantalum | |
| C076 | 1-123-317-00 | 22 | 16V | elect | |
| C077 | 1-101-006-00 | 0.047 | | | |
| C078 | 1-123-320-00 | 100 | 16V | elect | |
| C079 | 1-123-317-00 | 22 | 16V | elect | |
| C080 | 1-123-328-00 | 4.7 | 25V | elect | |
| C081 | 1-123-352-00 | 1 | 50V | elect | |
| C082 | 1-123-353-00 | 2.2 | 50V | elect | |
| C085 | 1-123-354-00 | 3.3 | 50V | elect | |
| C086 | 1-101-001-00 | 0.001 | | | |
| C401 | 1-123-352-00 | 1 | 50V | elect | |
| C402 | 1-123-318-00 | 33 | 16V | elect | |
| C403 | 1-123-306-00 | 47 | 10V | elect | |
| C404 | 1-102-973-00 | 100p | | | |
| C405 | 1-101-884-00 | 56p | | | |
| C406 | 1-101-001-00 | 0.001 | | | |
| C407 | 1-123-352-00 | 1 | 50V | elect | |
| C408 | 1-123-320-00 | 100 | 16V | elect | |
| C409 | 1-123-316-00 | 10 | 16V | elect | |
| C410 | 1-123-317-00 | 22 | 16V | elect | |
| C411 | 1-123-328-00 | 4.7 | 25V | elect | |
| C412, 413 | 1-123-316-00 | 10 | 16V | elect | |
| C414 | 1-123-318-00 | 33 | 16V | elect | |
| C415 | 1-108-611-00 | 0.22 | | mylar | |
| C416 | 1-123-316-00 | 10 | 16V | elect | |
| C417 | 1-102-816-00 | 120p | | | |
| C418 | 1-123-316-00 | 10 | 16V | elect | |
| C419 | 1-108-589-00 | 0.027 | | mylar | |
| C420 | 1-108-555-00 | 0.001 | | mylar | |
| C421 | 1-102-980-00 | 270p | | | |
| C422 | 1-107-171-00 | 120p | 500V | mica | |
| C423 | 1-129-709-00 | 0.0039 | 630V | film | |
| C424 | 1-108-587-00 | 0.022 | | mylar | |
| C425 | 1-108-591-00 | 0.033 | | mylar | |
| C426 | 1-123-319-00 | 47 | 16V | elect | |
| C428 | 1-123-317-00 | 22 | 16V | elect | |
| C429 | 1-131-341-00 | 0.1 | 35V | tantalum | |

| Ref. No. | Part No. | Description | Remark |
|---|---|---|---|
| C430 | 1-123-352-00 | 1 50V elect | |
| C431 | 1-108-579-00 | 0.01 mylar | |
| C432 | 1-123-316-00 | 10 16V elect | |
| C433 | 1-102-959-00 | 22p | |
| C434 | 1-123-328-00 | 4.7 25V elect | |
| C435 | 1-123-316-00 | 10 16V elect | |
| C436 | 1-108-559-00 | 0.0015 mylar | |
| C437 | 1-123-316-00 | 10 16V elect | |
| C438 | 1-123-317-00 | 22 16V elect | |
| C439 | 1-102-977-00 | 200p | |
| C440 | 1-123-305-00 | 33 10V elect | |
| C441 | 1-123-352-00 | 1 50V elect | |
| C442 | 1-123-307-00 | 100 10V elect | |
| C443 | 1-102-973-00 | 100p | |
| C444 | 1-123-316-00 | 10 16V elect | |
| C445 | 1-123-307-00 | 100 10V elect | |
| C446 | 1-101-001-00 | 0.001 | |
| C447 | 1-108-589-00 | 0.027 mylar | |
| C448 | 1-102-973-00 | 100p | |
| C449 | 1-123-328-00 | 4.7 25V elect | |
| C450 | 1-123-320-00 | 100 16V elect | |
| C451 | 1-123-318-00 | 33 16V elect | |
| C452, 453 | 1-123-319-00 | 47 16V elect | |
| C454 | 1-108-573-00 | 0.0056 mylar | |
| C456 | 1-108-555-00 | 0.001 mylar | |
| C457–459 | 1-123-316-00 | 10 16V elect | |
| ♠CN001, 002 | 1-508-742-00 | 3P connector | |
| ♠CN005 | 1-508-846-00 | 8P connector | |
| ♠CN006 | 1-508-742-00 | 3P connector | |
| ♠CN007 | 1-508-845-00 | 6P connector | |
| ♠CN008 | 1-508-797-00 | 4P connector | |
| ♠CN009, 010 | 1-508-744-00 | 10P connector | |
| ♠CN011 | 1-508-797-00 | 4P connector | |
| ♠CN012 | 1-508-742-00 | 3P connector | |
| L401 | 1-407-492-00 | 1mH | |
| L402 | 1-407-504-00 | 10mH | |
| L403 | 1-407-191-XX | 470$\mu$H | |
| LV401 | 1-407-240-00 | Inductor, variable 22mH | |
| LV402 | 1-407-286-00 | Inductor, variable 2.2mH | |
| R009 | 1-202-472-00 | 5.1M 1/4W composition | |
| R020 | 1-212-684-00 | 18k 1/2W metal oxide | |
| R036 | 1-214-168-00 | 33k 1/4W metal oxide | |
| R039 | 1-214-176-00 | 68k 1/4W metal oxide | |
| R040 | 1-214-172-00 | 47k 1/4W metal oxide | |

| Ref. No. | Part No. | Description | Remark |
|---|---|---|---|
| R041 | 1-212-702-00 | 100k 1/2W metal oxide | |
| R044 | 1-214-178-00 | 82k 1/4W metal oxide | |
| R046 | 1-212-702-00 | 100k 1/2W metal oxide | |
| R054 | 1-214-162-00 | 18k 1/4W metal oxide | |
| R082 | 1-202-472-00 | 5.1M 1/4W composition | |
| R126 | 1-246-791-00 | 4.7k 1/8W carbon | |
| R401 | 1-246-801-00 | 33k 1/8W carbon | |
| R402 | 1-246-806-00 | 82k 1/8W carbon | |
| R404 | 1-246-807-00 | 100k 1/8W carbon | |
| R405 | 1-246-802-00 | 39k 1/8W carbon | |
| R406 | 1-246-795-00 | 10k 1/8W carbon | |
| R407 | 1-246-787-00 | 2.2k 1/8W carbon | |
| R408 | 1-246-807-00 | 100k 1/8W carbon | |
| R409 | 1-246-795-00 | 10k 1/8W carbon | |
| R410 | 1-246-783-00 | 1k 1/8W carbon | |
| R414 | 1-210-825-00 | 3.3M 1/4W composition | |
| ⚠R418 | 1-246-991-00 | 150 1/8W carbon (nonflammable) | |
| ⚠R428 | 1-212-849-00 | 4.7 1/4W fuse (nonflammable) | |
| R431 | 1-246-795-00 | 10k 1/8W carbon | |
| R452 | 1-246-759-00 | 10 1/8W carbon | |
| R494, 495 | 1-246-801-00 | 33k 1/8W carbon | |
| RV001–003 | 1-224-647-XX | 47k, adjustable | |
| RV004 | 1-224-254-XX | 47k, adjustable | |
| RV005 | 1-224-253-XX | 22k, adjustable | |
| RV006, 007 | 1-224-648-XX | 100k, adjustable | |
| RV008 | 1-224-253-XX | 22k, adjustable | |
| RV009 | 1-224-254-XX | 47k, adjustable | |
| RV010 | 1-224-644-XX | 3.3k, adjustable | |
| RV011, 012 | 1-224-645-XX | 10k, adjustable | |
| RV401 | 1-224-646-XX | 22k, adjustable | |
| RV402 | 1-224-256-XX | 220k, adjustable | |
| RV403 | 1-224-645-XX | 10k, adjustable | |
| RV404 | 1-224-646-XX | 22k, adjustable | |
| RY401 | 1-515-335-00 | Relay | |
| RY402, 403 | 1-515-323-00 | Relay | |
| T401 | 1-405-670-00 | Transformer, OSC | |

## CB-1 BOARD

| | | | |
|---|---|---|---|
| ♠ | 1-601-836-00 | CB-1 Board | E-607 |
| C160 | 1-102-816-00 | 120p | |
| C164 | 1-101-004-00 | 0.01 | |

| *Ref. No.* | *Part No.* | *Description* | | | *Remark* |
|---|---|---|---|---|---|
| C165 | 1-101-006-00 | 0.047 | | | |
| C188 | 1-101-004-00 | 0.01 | | | |
| C352 | 1-123-294-00 | 47 | 6.3V | elect | |
| L035 | 1-407-177-XX | 470μH | | | |

## CH-3 BOARD

| *Ref. No.* | *Part No.* | *Description* | | | *Remark* |
|---|---|---|---|---|---|
| ♠ | A-6725-154-A | CH-3 Board, complete | | | E-151 |
| C001 | 1-131-347-00 | 1 | 35V | tantalum | |
| C002 | 1-108-251-00 | 0.1 | | mylar | |
| C003 | 1-161-323-00 | 1000p | | | |
| C004, 005 | 1-161-319-00 | 470p | | | |
| C006 | 1-108-365-00 | 0.001 | 100V | mylar | |
| C008 | 1-161-021-00 | 0.047 | | | |
| C009 | 1-161-271-00 | 100p | | | |
| C010 | 1-123-359-00 | 47 | 50V | elect | |
| C011, 012 | 1-123-316-00 | 10 | 16V | elect | |
| C014 | 1-161-323-00 | 1000p | | | |
| C015 | 1-123-352-00 | 1 | 50V | elect | |
| C016 | 1-131-345-00 | 0.47 | 35V | tantalum | |
| C017 | 1-161-021-00 | 0.047 | | | |
| C018 | 1-123-352-00 | 1 | 50V | elect | |
| C019 | 1-161-013-00 | 0.01 | | | |
| C020 | 1-161-271-00 | 100p | | | |
| C021 | 1-161-263-00 | 22p | | | |
| C022 | 1-161-271-00 | 100p | | | |
| C023 | 1-108-820-00 | 0.22 | | mylar | |
| C024 | 1-161-265-00 | 33p | | | |
| C025 | 1-123-228-00 | 1 | 50V | elect | |
| C026, 027 | 1-161-223-00 | 0.022 | | | |
| C028 | 1-123-353-00 | 2.2 | 50V | elect | |
| C029 | 1-161-013-00 | 0.01 | | | |
| C030 | 1-131-349-00 | 2.2 | 35V | tantalum | |
| C031 | 1-161-323-00 | 1000p | | | |
| C032 | 1-123-228-00 | 1 | 50V | elect | |
| C033 | 1-131-345-00 | 0.47 | 35V | tantalum | |
| ♠CN002 | 1-508-735-00 | 5P connector | | | |
| ♠CN003 | 1-508-736-00 | 10P connector | | | |
| ♠CN004 | 1-508-847-00 | 4P connector | | | |
| ♠CN005 | 1-508-848-00 | 6P connector | | | |
| ♠CN006 | 1-508-735-00 | 5P connector | | | |
| ♠CN007, 008 | 1-508-734-00 | 3P connector | | | |
| ♠CN009 | 1-508-849-00 | 8P connector | | | |
| L001 | 1-407-184-XX | 3.3μH | | | |
| R007 | 1-202-463-00 | 2.2M | 1/4W | composition | |
| ⚠R073, 074 | 1-213-155-00 | 10k | 1W | metal oxide (nonflammable) | |
| RV001 | 1-224-251-XX | 4.7k, adjustable | | | |
| S001–005 | 1-552-174-00 | push | | | |
| S006, 007 | 1-516-226-00 | slide | | | |

## CI-1 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ♠ | 1-601-831-00 | CI-1 Board | E-153 |
| ♠CN010 | 1-508-849-00 | 8P connector | |
| S010–021 | 1-552-412-00 | keyboard | |
| | 1-526-638-00 | socket, IC (9p) | |

## CN-5 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ♠ | 1-601-762-00 | CN-5 Board | E-454 |
| ♠CN1, 2 | 1-508-734-00 | 3P connector | |

## CN-6 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ♠ | 1-601-763-00 | CN-6 Board | E-455 |
| S1 | 1-552-180-00 | REED, SLACK SENSOR | E-452 |

## CR-4 BOARD

| Ref. No. | Part No. | Description | Remark |
|---|---|---|---|
| ♠ | A-6711-217-A | CR-4 Board, complete | E-601 |
| C005 | 1-108-377-00 | 0.01 100V mylar | |
| C007 | 1-101-004-00 | 0.01 | |
| C008 | 1-123-316-00 | 10 16V elect | |
| C009 | 1-101-005-00 | 0.022 | |
| C010, 011 | 1-102-531-00 | 150p | |
| C012 | 1-123-316-00 | 10 16V elect | |
| C013, 014 | 1-101-005-00 | 0.022 | |
| C015–017 | 1-101-004-00 | 0.01 | |
| C018 | 1-101-006-00 | 0.047 | |
| C019 | 1-106-172-00 | 0.001 100V mylar | |
| C020 | 1-102-525-00 | 68p | |
| C021 | 1-108-246-00 | 0.047 mylar | |
| C022 | 1-101-006-00 | 0.047 | |
| C023 | 1-101-059-00 | 510p | |
| C024 | 1-108-242-00 | 0.022 mylar | |
| C025 | 1-108-364-00 | 0.18 mylar | |
| C026 | 1-101-004-00 | 0.01 | |
| C028 | 1-101-974-00 | 20p | |
| C029 | 1-101-005-00 | 0.022 | |
| C030 | 1-102-527-00 | 82p | |
| C031, 032 | 1-101-005-00 | 0.022 | |
| C033 | 1-101-004-00 | 0.01 | |
| C034 | 1-108-377-00 | 0.01 100V mylar | |
| C035 | 1-101-059-00 | 510p | |
| C036 | 1-108-369-00 | 0.0022 100V mylar | |
| C037 | 1-108-377-00 | 0.01 100V mylar | |
| C038 | 1-123-319-00 | 47 16V elect | |
| C039 | 1-101-006-00 | 0.047 | |
| C040 | 1-123-319-00 | 47 16V elect | |
| C041 | 1-101-006-00 | 0.047 | |
| C042, 043 | 1-101-004-00 | 0.01 | |
| C044 | 1-123-295-00 | 100 6.3V elect | |
| C045 | 1-101-006-00 | 0.047 | |
| C046 | 1-101-004-00 | 0.01 | |
| C048 | 1-123-328-00 | 4.7 25V elect | |
| C050 | 1-102-527-00 | 82p | |
| C051 | 1-101-004-00 | 0.01 | |
| ♠CN001 | 1-508-744-00 | 10P connector | |
| ♠CN002 | 1-508-845-00 | 6P connector | |
| ♠CN003 | 1-508-742-00 | 3P connector | |
| L002 | 1-407-189-XX | 8.2μH | |
| L003 | 1-407-213-XX | 1.5mH | |
| L005, 006 | 1-407-191-XX | 470μH | |
| L010 | 1-407-159-XX | 15μH | |
| LV001 | 1-407-568-00 | Coil, variable 6.8μH | |
| R018 | 1-244-857-00 | 220 1/2W carbon | |
| RV002 | 1-224-643-XX | 2.2k, adjustable | |
| RV003 | 1-224-645-XX | 10k, adjustable | |
| RV004, 005 | 1-224-644-XX | 4.7k, adjustable | |
| RV006 | 1-224-640-XX | 330k, adjustable | |

## FG-1 BOARD

| Ref. No. | Part No. | Description | Remark |
|---|---|---|---|
| ♠ | 1-600-101-00 | FG-1 Board | E-502 |

## FS-6 BOARD

| Ref. No. | Part No. | Description | Remark |
|---|---|---|---|
| ♠ | 1-601-825-00 | FS-6 Board | E-204 |
| C001 | 1-123-325-00 | 2200 16V elect | |
| C002 | 1-123-324-00 | 1000 16V elect | |
| ♠CN006–009 | 1-560-033-00 | 3P connector | |
| ♠CN010 | 1-560-136-00 | 4P connector | |
| ♠CN011 | 1-508-742-00 | 3P connector | |
| ♠CN012 | 1-508-797-00 | 4P connector | |
| ♠CN013 | 1-508-744-00 | 10P connector | |
| ♠CN014 | 1-508-849-00 | 8P connector | |
| ♠CN015 | 1-508-742-00 | 3P connector | |
| ⚠F001 | 1-532-285-00 | Fuse T1.25A | |
| ⚠F002 | 1-532-350-00 | Fuse T4A | |
| ⚠F003 | 1-532-286-00 | Fuse T2.5A | |
| ⚠F004 | 1-532-006-00 | Fuse T0.4A | |
| ⚠F005 | 1-532-469-00 | Fuse T0.1A | |
| ⚠F007 | 1-532-469-00 | Fuse T0.1A | |

## IF-10 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ♠ | A-6721-038-A | IF-10 Board, complete | E-157 |
| C501, 502 | 1-161-047-00 | 4700p | |
| C503 | 1-161-272-00 | 120p | |
| C504–509 | 1-161-047-00 | 4700p | |
| C510 | 1-123-355-00 | 4.7 50V | elect |
| C511 | 1-123-316-00 | 10 16V | elect |
| C512 | 1-161-047-00 | 4700p | |
| C513 | 1-161-280-00 | 12p | |
| C514 | 1-102-529-00 | 100p | |
| C515 | 1-161-323-00 | 1000p | |
| C516 | 1-123-321-00 | 220 16V | elect |
| C517 | 1-101-006-00 | 0.047 | |
| C518 | 1-103-725-00 | 0.001 | styrol |
| C519 | 1-161-051-00 | 0.01 | |
| C520, 521 | 1-101-006-00 | 0.047 | |
| C523 | 1-108-385-00 | 0.047 100V | mylar |
| C524–526 | 1-161-047-00 | 4700p | |
| C527 | 1-102-852-00 | 47p | |
| C528 | 1-102-525-00 | 68p | |
| C529 | 1-161-249-00 | 15p | |
| C530 | 1-161-259-00 | 10p | |
| C531–534 | 1-161-047-00 | 4700p | |
| C535 | 1-123-320-00 | 100 16V | elect |
| C536 | 1-161-267-00 | 47p | |
| C537 | 1-123-323-00 | 470 16V | elect |
| CF501 | 1-404-134-00 | Trap, ceramic | |
| CF502 | 1-527-263-00 | Ceramic Filter | |
| ♠CN501 | 1-508-743-00 | 5P connector | |
| ♠CN503 | 1-508-797-00 | 4P connector | |
| L501 | 1-404-221-00 | Coil, IF | |
| L502 | 1-407-184-XX | 3.3μH | |
| L503 | 1-407-159-XX | 15μH | |
| L504 | 1-407-157-XX | 10μH | |
| L505 | 1-407-184-XX | 3.3μH | |
| **⚠R517** | **1-247-005-00** | **100 carbon (nonflammable)** | |
| RV502 | 1-224-645-XX | 10k, adjustable | |
| RV502 | 1-224-644-XX | 4.7k, adjustable | |
| SF501 | 1-404-208-00 | Filter, surface wave | |
| T501 | 1-404-206-00 | VIFT-1 | |
| T502 | 1-404-207-00 | VIFT-2 | |
| T503 | 1-404-203-00 | VIF-3 | |
| T504 | 1-403-810-00 | AFT-1 | |
| T505 | 1-403-811-00 | AFT-2 | |
| T506 | 1-404-135-00 | SIFT-2 | |
| T507 | 1-404-097-00 | SIFT-1 | |

## IR-1 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ♠ | 1-601-834-00 | IR-1 Board | E-154 |
| C901, 902 | 1-123-316-00 | 10 16V | elect |
| C903, 904 | 1-102-525-00 | 68p | |
| C905, 906 | 1-101-004-00 | 0.01 | |
| C907 | 1-123-316-00 | 10 16V | elect |
| L901 | 1-409-315-00 | 100mH | |

## LF-11 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ♠ | 1-601-826-00 | LF-11 Board | E-208 |
| ♠CN001 | 1-560-033-00 | 3P PLUG | |
| ♠CN002, 003 | 1-508-786-00 | 2P PLUG | |
| ♠CN004, 005 | 1-560-033-00 | 3P PLUG | |
| **⚠F006** | **1-532-203-00** | **Fuse T2A** | |
| | 1-533-087-00 | HOLDER, fuse | |

## LS-3 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ♠ | A-6725-152-A | LS-3 Board, complete | E-309 |
| C501 | 1-101-004-00 | 0.01 | |
| C502 | 1-101-006-00 | 0.047 | |
| ♠CN501 | 1-508-847-00 | 4P connector | |
| ♠CN502 | 1-508-734-00 | 3P connector | |
| ♠CN503 | 1-508-847-00 | 4P connector | |
| ♠CN504 | 1-508-734-00 | 3P connector | |

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ⚠R508 | 1-211-929-00 | 82 1/8W carbon (nonflammable) | |
| ⚠R513 | 1-212-356-00 | 0.47 1W metal oxide (nonflammable) | |
| S501 | 1-553-035-00 | Lever | |

## NC-1 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ♠ | A-6711-221-A | NC-1 Board, complete | E-305 |
| C001 | 1-161-021-00 | 0.047 | |
| C002 | 1-123-320-00 | 100 16V elect | |
| C003 | 1-123-307-00 | 100 10V elect | |
| C004 | 1-123-316-00 | 10 16V elect | |
| C005 | 1-161-013-00 | 0.01 | |
| C006 | 1-161-006-00 | 0.0027 | |
| C007 | 1-102-117-00 | 820p | |
| C008 | 1-102-529-00 | 100p | |
| C009 | 1-123-319-00 | 47 16V elect | |
| C010 | 1-161-013-00 | 0.01 | |
| C011 | 1-161-017-00 | 0.022 | |
| C012 | 1-102-950-00 | 13p | |
| C013, 014 | 1-101-882-00 | 51p | |
| C015 | 1-102-950-00 | 13p | |
| C016, 017 | 1-123-296-00 | 220 6.3V elect | |
| C018 | 1-123-352-00 | 1 50V elect | |
| C019 | 1-161-271-00 | 100p | |
| C020 | 1-161-272-00 | 120p | |
| C021 | 1-123-307-00 | 100 10V elect | |
| C022 | 1-123-316-00 | 10 16V elect | |
| C023 | 1-123-296-00 | 220 6.3V elect | |
| C025 | 1-101-361-00 | 150p | |
| L001 | 1-407-171-XX | 150µH | |
| L002 | 1-407-170-XX | 120µH | |
| L003 | 1-407-172-XX | 180µH | |
| L004 | 1-407-170-XX | 120µH | |
| RV001 | 1-224-249-XX | 1k, adjustable | |

## PC-1 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ♠ | 1-601-835-00 | PC-1 Board | E-152 |
| C001 | 1-123-316-00 | 10 16V elect | |
| C002 | 1-102-074-00 | 0.001 | |
| C003 | 1-123-316-00 | 10 16V elect | |
| ♠CN001 | 1-508-742-00 | 3P connector | |
| ♠CN011 | 1-508-847-00 | 4P connector | |
| RV001 | 1-224-643-XX | 2.2k adjustable | |

## PL-2 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ♠ | 1-601-821-00 | PL-2 Board | E-105 |

## RF-2 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ♠ | A-6711-216-A | RF-2 Board, complete | E-304 |
| C001, 002 | 1-123-352-00 | 1 50V elect | |
| C003, 004 | 1-161-494-00 | 2200p | |
| C005, 006 | 1-101-006-00 | 0.047 | |
| C007, 008 | 1-161-494-00 | 2200p | |
| C009, 010 | 1-131-371-00 | 10 16V tantalum | |
| C011, 012 | 1-161-051-00 | 0.01 | |
| C014 | 1-123-353-00 | 2.2 50V elect | |
| C015 | 1-161-047-00 | 4700p | |
| C017, 018 | 1-101-882-00 | 51p | |
| C019 | 1-108-619-00 | 0.0027 100V mylar | |
| C020 | 1-161-319-00 | 470p | |
| C021 | 1-161-271-00 | 100p | |
| C022 | 1-108-619-00 | 0.0027 100V mylar | |
| C023 | 1-161-319-00 | 470p | |
| C024 | 1-161-051-00 | 0.01 | |
| C025 | 1-131-371-00 | 10 16V tantalum | |
| C026 | 1-161-317-00 | 330p | |
| C027 | 1-161-494-00 | 2200p | |
| C028 | 1-123-318-00 | 33 16V elect | |
| C029 | 1-161-494-00 | 2200p | |
| C030, 031 | 1-161-051-00 | 0.01 | |
| C032 | 1-101-005-00 | 0.022 | |
| C033 | 1-123-318-00 | 33 16V elect | |
| C034 | 1-123-351-00 | 0.47 50V elect | |
| C035 | 1-161-051-00 | 0.01 | |
| C036 | 1-101-006-00 | 0.047 | |
| C037 | 1-123-318-00 | 33 16V elect | |
| C038 | 1-102-953-00 | 18p | |

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ●CN001 | 1-508-744-00 | 10P connector | |
| ●CN002 | 1-508-797-00 | 4P connector | |
| ●CN003 | 1-508-845-00 | 6P connector | |
| L001, 002 | 1-408-029-00 | 0.56μH | |
| L003, 004 | 1-407-159-XX | 15μH | |
| L005, 006 | 1-408-158-00 | 6.8mH | |
| L007 | 1-407-706-00 | 120μH | |
| L008 | 1-407-496-00 | 2.2mH | |
| L009 | 1-407-195-XX | 1mH | |
| L010 | 1-407-157-XX | 10μH | |
| LV001 | 1-407-286-00 | Inductor, variable | |
| ⚠R019, 030 | 1-212-855-00 | 8.2 1/4W fuse (nonflammable) | |
| ⚠R051 | 1-211-929-00 | 82 1/8W carbon (nonflammable) | |
| ⚠R053 | 1-211-421-00 | 39 1/8W carbon (nonflammable) | |
| ⚠R056 | 1-212-855-00 | 8.2 1/4W fuse (nonflammable) | |
| ⚠R059 | 1-212-855-00 | 8.2 1/4W fuse (nonflammable) | |
| RV001–003 | 1-224-643-XX | 2.2k, adjustable | |
| RV004 | 1-224-644-XX | 4.7k, adjustable | |
| RV005 | 1-224-642-XX | 1k, adjustable | |
| RV006 | 1-224-644-XX | 3.3k, adjustable | |
| T001, 002 | 1-427-455-00 | RFT | |

## RM-1 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ● | 1-601-832-00 | RM-1 Board | E-701 |
| C801 | 1-131-371-00 | 10 16V tantalum | |
| C802, 803 | 1-102-531-00 | 150p | |
| C804 | 1-527-476-00 | OSCILLATOR, ceramic | |
| ●CN801 | 1-560-211-00 | 15p PLUG | |

## RM-2 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ● | 1-601-833-00 | RM-2 Board | E-702 |
| ●CN802 | 1-561-340-00 | 15P connector | |

## SJ-1 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ● | A-6717-143-A | SJ-1 Board, complete | E-308 |
| C701 | 1-131-349-00 | 2.2 35V tantalum | |
| C702 | 1-131-344-00 | 0.33 35V tantalum | |
| C703 | 1-101-004-00 | 0.01 | |
| C704 | 1-123-317-00 | 22 16V elect | |
| C705, 706 | 1-123-351-00 | 0.47 50V elect | |
| C707 | 1-123-328-00 | 4.7 25V elect | |
| C708 | 1-123-319-00 | 47 16V elect | |
| C709 | 1-123-352-00 | 1 50V elect | |
| C710 | 1-123-351-00 | 0.47 50V elect | |
| C711 | 1-101-006-00 | 0.047 | |
| C712 | 1-123-354-00 | 3.3 50V elect | |
| C713 | 1-101-004-00 | 0.01 | |
| C714 | 1-123-317-00 | 22 16V elect | |
| C715 | 1-101-004-00 | 0.01 | |
| C716 | 1-123-328-00 | 4.7 25V elect | |
| C717 | 1-123-351-00 | 0.47 50V elect | |
| C718 | 1-123-316-00 | 10 16V elect | |
| ●CN701 | 1-508-736-21 | 10P connector | |
| ●CN702 | 1-508-736-00 | 10P connector | |

## SR-08 (SWITCHING REGULATOR)

### SR-08-1 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ⚠● | 2-402-645-00 | SR-08-1 Board (includng SR-08-2) | E-206 |
| ⚠C101, 102 | 1-130-160-11 | 0.22 AC250V | |
| ⚠C103, 104 | 1-161-738-11 | 0.0047 AC400V | |
| ⚠C105 | 1-130-438-11 | 0.01 600V | |
| ⚠C106, 107 | 1-161-734-11 | 0.0022 AC400V | |
| ⚠C108 | 1-123-581-11 | 100 400V elect | |
| ⚠C212, 213 | 1-108-657-11 | 0.01 100V film | |
| ⚠C214 | 1-123-349-61 | 1000 35V elect | |
| ⚠C215 | 1-123-346-61 | 220 35V elect | |
| ⚠C216, 217 | 1-123-342-61 | 22 35V elect | |

**SR-08** **SY-10**

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ⚠C219, 220 | 1-123-320-61 | 100 16V elect | |
| ⚠C221 | 1-108-860-11 | 0.0022 film | |
| ⚠● CN101 | 1-560-033-11 | 3P connector | |
| ⚠● CN201 | 1-508-742-11 | 3P connector | |
| ⚠L101, 102 | 1-459-215-11 | 120μH | |
| ⚠L203 | 1-407-168-11 | 82μH | |
| ⚠R101 | 1-217-255-11 | 3.3 3W wire wound<br>(nonflammable) | |
| ⚠R218 | 1-246-489-00 | 4.7k 1/4W carbon | |
| ⚠R219 | 1-246-499-00 | 12k 1/4W carbon | |
| ⚠R220 | 1-246-483-00 | 2.7k 1/4W carbon | |
| ⚠R221 | 1-246-490-00 | 5.1k 1/4W carbon | |
| ⚠R222 | 1-246-489-00 | 4.7k 1/4W carbon | |
| ⚠R223 | 1-246-509-00 | 33k 1/4W carbon | |
| ⚠R226 | 1-246-521-00 | 100k 1/4W carbon | |
| ⚠R227 | 1-246-489-00 | 4.7k 1/4W carbon | |
| ⚠RV202 | 1-226-233-11 | 1k, adjustable | |
| ⚠T101 | 1-421-377-11 | LFT | |
| ⚠T201 | 1-446-559-11 | INVERTER TRANS | |

### SR-08-2 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ⚠● | 2-402-645-00 | SR-08-2 Board (including SR-08-1) | E-206 |
| ⚠C109 | 1-123-581-11 | 100 400V elect | |
| ⚠C110, 111 | 1-123-580-61 | 4.7 350V elect | |
| ⚠C201 | 1-108-657-11 | 0.01 100V film | |
| ⚠C202 | 1-123-323-61 | 470 16V elect | |
| ⚠C203, 204 | 1-123-324-61 | 1000 16V elect | |
| ⚠C205, 206 | 1-108-870-11 | 0.1 50V film | |
| ⚠C207 | 1-108-657-11 | 0.01 100V film | |
| ⚠C208 | 1-123-316-61 | 10 16V elect | |
| ⚠C209 | 1-130-289-51 | 0.0047 100V film | |
| ⚠C210 | 1-130-297-51 | 0.01 100V film | |
| ⚠C211 | 1-123-305-61 | 33 10V elect | |
| ⚠C222 | 1-108-657-11 | 0.01 100V film | |
| ⚠L201 | 1-408-322-11 | 300μH (with magnet) | |
| ⚠L202 | 1-408-321-11 | 300μH | |
| ⚠R201 | 1-212-376-11 | 22 1W metal oxide<br>(nonflammable) | |
| ⚠R202 | 1-246-449-00 | 100 1/4W carbon | |
| ⚠R203 | 1-246-485-00 | 3.3k 1/4W carbon | |
| ⚠R204 | 1-217-596-51 | 0.05 2W metal<br>(nonflammable) | |
| ⚠R205 | 1-217-483-00 | 2.7k 1/4W carbon | |
| ⚠R206 | 1-217-490-00 | 5.1k 1/4W carbon | |
| ⚠R207 | 1-217-449-00 | 100 1/4W carbon | |
| ⚠R208 | 1-217-497-00 | 10k 1/4W carbon | |
| ⚠R209 | 1-217-501-00 | 15k 1/4W carbon | |
| ⚠R210, 211 | 1-217-489-00 | 4.7k 1/4W carbon | |
| ⚠R212 | 1-217-473-00 | 1k 1/4W carbon | |
| ⚠R213 | 1-217-489-00 | 4.7k 1/4W carbon | |
| ⚠R214, 215 | 1-217-497-00 | 10k 1/4W carbon | |
| ⚠R216 | 1-217-513-00 | 47k 1/4W carbon | |
| ⚠R224 | 1-212-857-51 | 10 fuse resistor<br>(nonflammable) | |
| ⚠R225 | 1-247-208-11 | 47 1/2W carbon<br>(nonflammable) | |
| ⚠RV201 | 1-226-232-11 | 500 adjustable | |
| ⚠T102 | 1-446-558-11 | CONVERTER TRANS | |
| ⚠T103 | 1-437-085-11 | DRIVE TRANS | |

### MISCELLANEOUS (SR-08)

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ⚠T104 | 1-446-589-12 | POWER TRANS | E-205 |
| ⚠ | 2-431-005-00 | 3P connector ass'y<br>(with RED/ORG/BLK leads) | |
| ⚠ | 2-431-006-00 | 4P connector ass'y<br>(with BLU/YEL/YEL leads) | |
| ⚠ | 2-431-007-00 | 4P connector ass'y<br>(with RED/ORG/BLK/BLK leads) | |
| ⚠ | 2-431-008-00 | 3P connector ass'y<br>(with BRN/WHT leads) | |
| ⚠ | 2-431-012-00 | 3P connector ass'y<br>(with RED/YEL leads) | |

## SY-10 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ● | A-6717-142-A | SY-10 Board, complete | E-307 |
| C501 | 1-108-417-00 | 0.0047 200V mylar | |
| C502 | 1-101-004-00 | 0.01 50V mylar | |
| C503 | 1-101-001-00 | 0.001 | |
| C504 | 1-123-352-00 | 1 50V elect | |

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| C505 | 1-101-004-00 | 0.01 50V mylar | |
| C506 | 1-123-319-00 | 47 16V elect | |
| ♦CN501 | 1-508-850-00 | 12P connector | |
| ♦CN502 | 1-508-736-00 | 10P connector | |
| ♦CN503 | 1-508-848-00 | 6P connector | |
| ♦CN504 | 1-508-734-00 | 3P connector | |
| RV501 | 1-226-496-00 | 100k, variable | |
| S501–512 | 1-552-412-00 | keyboard | |
| S513, 514 | 1-516-994-00 | lever slide | |
| SP501 | 1-529-010-00 | Buzzer | |
| T501 | 1-405-800-00 | OSC | |

## SY-11 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ♦ | A-6717-140-A | SY-11 Board, complete | E-306 |
| C001 | 1-129-794-00 | 0.0033 100V film | |
| C002–005 | 1-123-352-00 | 1 50V elect | |
| C006 | 1-129-794-00 | 0.0033 100V film | |
| C007, 008 | 1-123-352-00 | 1 50V elect | |
| C009 | 1-123-328-00 | 4.7 25V elect | |
| C010–012 | 1-130-201-00 | 0.068 polypropylene | |
| C013 | 1-131-345-00 | 0.47 35V tantalum | |
| C014 | 1-131-347-00 | 1 35V tantalum | |
| C016 | 1-123-317-00 | 22 16V elect | |
| C017–019 | 1-101-004-00 | 0.01 (nonpolarized) | |
| C020, 021 | 1-123-328-00 | 4.7 25V elect | |
| C022 | 1-123-320-00 | 100 16V elect | |
| C023, 024 | 1-123-318-00 | 33 16V elect | |
| ♦CN001 | 1-508-846-00 | 8P connector | |
| ♦CN002 | 1-508-797-00 | 4P connector | |
| ♦CN003, 004 | 1-508-744-00 | 10P connector | |
| ♦CN005 | 1-508-846-00 | 8P connector | |
| ♦CN006 | 1-508-847-00 | 4P connector | |
| ♦CN007, 008 | 1-508-797-00 | 4P connector | |
| ♦CN009 | 1-508-734-00 | 3P connector | |
| ♦CN010, 011 | 1-508-742-00 | 3P connector | |
| ♦CN012 | 1-508-744-00 | 10P connector | |
| ♦CN013 | 1-508-736-00 | 10P connector | |
| ♦CN014 | 1-508-910-00 | 12P connector | |
| ♦CN015 | 1-508-744-00 | 10P connector | |
| ♦CN016 | 1-508-845-00 | 6P connector | |
| L001, 002 | 1-407-212-XX | 33mH | |
| RV001, 002 | 1-224-256-XX | 220k, adjustable | |
| T001, 002 | 1-405-800-00 | Transformer, OSC | |

## TM-10 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ♦ | A-6725-151-A | B-25 Board, complete (including TM-10, TM-11, TM-12 boards) | E-201 |
| C001 | 1-123-356-00 | 10 50V elect | |
| C002 | 1-123-317-00 | 22 16V elect | |
| C003 | 1-123-294-00 | 47 6.3V elect | |
| C004 | 1-123-316-00 | 10 16V elect | |
| C005 | 1-123-352-00 | 1 50V elect | |
| C006 | 1-123-316-00 | 10 16V elect | |
| C007 | 1-108-802-00 | 0.0068 mylar | |
| C008 | 1-102-074-00 | 0.001 | |
| C009 | 1-101-974-00 | 20p | |
| C010 | 1-102-703-00 | 120p | |
| C011 | 1-161-271-00 | 100p | |
| C012 | 1-123-351-00 | 0.47 50V elect | |
| C014 | 1-123-306-00 | 47 10V elect | |
| ♦CN001 | 1-508-744-00 | 10P connector | |
| ♦CN002 | 1-508-846-00 | 8P connector | |
| ♦CN003, 004 | 1-508-847-00 | 4P connector | |
| CV001 | 1-141-228-00 | Trimmer | |
| RB001 | | COMPOSITION CIRCUIT | |
| RB002 | 1-231-599-00 | COMPOSITION CIRCUIT | |
| RB003 | 1-231-659-00 | COMPOSITION CIRCUIT | |
| RB004 | 1-231-569-00 | COMPOSITION CIRCUIT | |
| RB005 | 1-231-659-00 | COMPOSITION CIRCUIT | |

| Ref. No. | Part No. | Description | Remark |
|---|---|---|---|
| S001 | 1-516-226-00 | Slide | |
| S002–020 | 1-552-438-00 | Key | |
| X001 | 1-527-552-00 | Radiator, crystal | |

## TM-11 BOARD

| Ref. No. | Part No. | Description | Remark |
|---|---|---|---|
| ♠ | A-6725-151-A | B-25 Board, complete (including TM-10, TM-11, TM-12 boards) | E-201 |
| C101 | 1-108-792-00 | 0.001 | |
| C102, 103 | 1-123-320-00 | 100 16V elect | |
| C104 | 1-123-317-00 | 22 16V elect | |
| C105 | 1-161-019-00 | 0.033 | |
| L101 | 1-407-168-XX | 82μH | |
| S101 | 1-552-823-00 | Power | |
| T101 | 1-446-571-00 | Transformer, DC-convertor | |
| V101 | 1-528-074-00 | BATTERY, nickel cadmium | |

## TM-12 BOARD

| Ref. No. | Part No. | Description | Remark |
|---|---|---|---|
| ♠ | A-6725-151-A | B-25 Board, complete (including TM-10, TM-11, TM-12 boards) | E-201 |
| C201 | 1-123-351-00 | 0.47 50V elect | |
| C202 | 1-123-357-00 | 22 50V elect | |
| DP201 | 1-519-174-00 | Indicator, tube | E-202 |

## TU-11 BOARD

| Ref. No. | Part No. | Description | Remark |
|---|---|---|---|
| ♠ | A-6721-037-A | TU-11 Board, complete | E-156 |
| C101 | 1-123-330-00 | 22 25V elect | |
| C102 | 1-123-328-00 | 4.7 25V elect | |
| C103 | 1-123-316-00 | 10 16V elect | |
| C104 | 1-123-318-00 | 33 16V elect | |
| C105 | 1-102-884-00 | 33p | |
| C106 | 1-102-863-00 | 82p | |
| C107 | 1-102-884-00 | 33p | |
| C108 | 1-102-889-00 | 39p | |
| C109 | 1-102-125-00 | 0.0047 | |
| C110 | 1-102-963-00 | 33p | |
| C111 | 1-102-125-00 | 0.0047 | |
| C112 | 1-102-953-00 | 18p | |
| C113 | 1-102-676-00 | 68p | |
| C114 | 1-121-419-00 | 220 6.3V elect | |
| C115 | 1-121-806-00 | 10 16V elect | |
| C116 | 1-123-319-00 | 47 16V elect | |
| C117 | 1-123-352-00 | 1 50V elect | |
| C118 | 1-108-591-00 | 0.033 mylar | |
| C119 | 1-108-367-00 | 0.0015 100V mylar | |
| C120 | 1-123-320-00 | 100 16V elect | |
| C121 | 1-123-319-00 | 47 16V elect | |
| C122, 123 | 1-123-351-00 | 0.47 50V elect | |
| C124 | 1-102-973-00 | 100p | |
| C125 | 1-123-355-00 | 4.7 50V elect | |
| C126 | 1-123-383-00 | 4.7 100V elect | |
| C127 | 1-108-638-00 | 0.1 100V mylar | |
| C128 | 1-102-125-00 | 0.0047 | |
| C129 | 1-123-320-00 | 100 16V elect | |
| C132 | 1-108-812-00 | 0.047 mylar | |
| C133 | 1-108-249-00 | 0.068 mylar | |
| C134 | 1-161-265-00 | 33p | |
| ♠CN101 | 1-508-797-00 | 4P connector | |
| ♠CN102 | 1-508-743-00 | 5P connector | |
| ♠CN103 | 1-508-910-00 | 12P connector | |
| ♠CN104 | 1-508-743-00 | 5P connector | |
| ♠CN105 | 1-508-845-00 | 6P connector | |
| ♠CN107 | 1-508-742-00 | 3P connector | |
| ♠CN108 | 1-508-845-00 | 6P connector | |
| JK101, 102 | 1-526-575-00 | 1P socket | |
| L101 | 1-407-186-XX | 4.7μH | |
| L102, 103 | 1-407-178-XX | 1μH | |
| L104 | 1-407-169-XX | 100μH | |
| L105 | 1-407-696-00 | 18μH | |
| L106 | 1-407-169-XX | 100μH | |
| ⚠R126 | 1-246-979-00 | 1.2 1/8W carbon (nonflammable) | |

| Ref. No. | Part No. | Description | Remark |
|---|---|---|---|
| RV101 | 1-224-645-XX | 10k, adjustable | |
| T101 | 1-404-096-00 | VHF | |
| T102 | 1-446-585-00 | DC-Convertor | |
| ⚠TU101 | 1-463-242-00 | UHF ET tuner U322 | |
| ⚠TU102 | 1-463-243-00 | VHF ET tuner V314 | |

## YC-6 BOARD

| Ref. No. | Part No. | Description | Remark |
|---|---|---|---|
| ● | A-6711-215-A | YC-6 Board, complete | E-606 |
| C001 | 1-101-004-00 | 0.01 | |
| C002 | 1-123-307-00 | 100 10V elect | |
| C003, 004 | 1-102-965-00 | 39p | |
| C006, 007 | 1-123-306-00 | 47 10V elect | |
| C008 | 1-102-823-00 | 430p | |
| C009 | 1-102-976-00 | 180p | |
| C010 | 1-161-021-00 | 0.047 | |
| C011 | 1-123-351-00 | 0.47 50V elect | |
| C012 | 1-123-316-00 | 10 16V elect | |
| C013 | 1-123-307-00 | 100 10V elect | |
| C014 | 1-123-318-00 | 33 16V elect | |
| C015 | 1-102-961-00 | 27p | |
| C016 | 1-123-316-00 | 10 16V elect | |
| C017 | 1-102-950-00 | 13p | |
| C018 | 1-101-882-00 | 51p | |
| C019 | 1-101-004-00 | 0.01 | |
| C020 | 1-101-882-00 | 51p | |
| C021 | 1-123-320-00 | 100 16V elect | |
| C022 | 1-102-950-00 | 13p | |
| C023 | 1-102-530-00 | 120p | |
| C025 | 1-102-816-00 | 120p | |
| C028 | 1-102-953-00 | 18p | |
| C031 | 1-102-976-00 | 180p | |
| C032 | 1-101-880-00 | 47p | |
| C033, 034 | 1-123-311-00 | 1000 10V elect | |
| C035 | 1-123-306-00 | 47 10V elect | |
| C036 | 1-161-013-00 | 0.01 | |
| C037 | 1-101-059-00 | 510p | |
| C038 | 1-161-025-00 | 0.1 | |
| C039 | 1-102-820-00 | 330p | |
| C040 | 1-161-013-00 | 0.01 | |
| C041 | 1-123-316-00 | 10 16V elect | |
| C042 | 1-161-021-00 | 0.047 | |
| C043 | 1-123-320-00 | 100 16V elect | |
| C044 | 1-101-890-00 | 75p | |
| C045 | 1-102-951-00 | 15p | |
| C046 | 1-102-978-00 | 220p | |
| C047 | 1-123-319-00 | 47 16V elect | |
| C048 | 1-123-307-00 | 100 10V elect | |
| C049 | 1-123-306-00 | 220 10V elect | |
| C050, 051 | 1-123-318-00 | 33 16V elect | |
| C052 | 1-161-021-00 | 0.047 | |
| C053 | 1-161-013-00 | 0.01 | |
| C054 | 1-123-316-00 | 10 16V elect | |
| C055 | 1-123-320-00 | 100 16V elect | |
| C056 | 1-123-319-00 | 47 16V elect | |
| C057 | 1-123-317-00 | 22 16V elect | |
| C058 | 1-161-013-00 | 0.01 | |
| C059, 060 | 1-123-319-00 | 47 16V elect | |
| C061 | 1-161-013-00 | 0.01 | |
| C062 | 1-102-116-00 | 680p | |
| C063–067 | 1-161-013-00 | 0.01 | |
| C068 | 1-102-953-00 | 18p | |
| C069 | 1-101-004-00 | 0.01 | |
| C070 | 1-101-006-00 | 0.047 | |
| C071 | 1-101-884-00 | 56p | |
| C072 | 1-102-979-00 | 240p | |
| C073 | 1-102-822-00 | 390p | |
| C074 | 1-131-199-00 | 10 16V tantalum | |
| C075 | 1-101-004-00 | 0.01 | |
| C076–078 | 1-101-006-00 | 0.047 | |
| C079, 080 | 1-123-328-00 | 4.7 25V elect | |
| C081 | 1-101-006-00 | 0.047 | |
| C083 | 1-123-316-00 | 10 16V elect | |
| C084 | 1-101-006-00 | 0.047 | |
| C085 | 1-131-202-00 | 1.5 20V tantalum | |
| C086 | 1-102-824-00 | 470p | |
| C087 | 1-101-884-00 | 56p | |
| C088 | 1-102-978-00 | 220p | |
| C089 | 1-101-004-00 | 0.01 | |
| C091–095 | 1-101-004-00 | 0.01 | |
| C096 | 1-101-006-00 | 0.047 | |
| C097 | 1-102-816-00 | 120p | |
| C098, 099 | 1-102-961-00 | 27p | |
| C101 | 1-101-004-00 | 0.01 | |
| C102, 103 | 1-101-361-00 | 150p | |
| C105 | 1-101-006-00 | 0.047 | |
| C106–109 | 1-101-004-00 | 0.01 | |
| C110 | 1-131-196-00 | 2.2 20V tantalum | |
| C111 | 1-108-630-00 | 0.022 100V mylar | |
| C112–114 | 1-101-004-00 | 0.01 | |
| C115 | 1-123-319-00 | 47 16V elect | |
| C116 | 1-123-316-00 | 10 16V elect | |
| C117 | 1-101-006-00 | 0.047 | |
| C118 | 1-101-004-00 | 0.01 | |
| C120 | 1-102-973-00 | 100p | |
| C121 | 1-102-820-00 | 330p | |
| C122 | 1-101-006-00 | 0.047 | |

## YC-6

| Ref. No. | Part No. | Description | Remark |
|---|---|---|---|
| C123 | 1-102-973-00 | 100p | |
| C124 | 1-123-306-00 | 47 10V elect | |
| C125 | 1-123-352-00 | 1 50V elect | |
| C126 | 1-123-319-00 | 47 16V elect | |
| C129 | 1-101-004-00 | 0.01 | |
| C130 | 1-102-851-00 | 15p | |
| C131 | 1-123-352-00 | 1 50V elect | |
| C132, 133 | 1-108-627-00 | 0.012 100V mylar | |
| C134 | 1-123-352-00 | 1 50V elect | |
| C135 | 1-102-852-00 | 47p | |
| C136 | 1-101-004-00 | 0.01 | |
| C137 | 1-101-001-00 | 0.001 | |
| C138 | 1-101-004-00 | 0.01 | |
| C139 | 1-108-638-00 | 0.1 100V mylar | |
| C140 | 1-102-820-00 | 330p | |
| C141 | 1-102-978-00 | 220p | |
| C142 | 1-123-352-00 | 1 50V elect | |
| C143 | 1-108-622-00 | 0.0047 100V mylar | |
| C144 | 1-101-003-00 | 0.0047 | |
| C146 | 1-123-352-00 | 1 50V elect | |
| C147 | 1-102-516-00 | 27p | |
| C148 | 1-123-328-00 | 4.7 25V elect | |
| C149 | 1-102-973-00 | 100p | |
| C150 | 1-101-004-00 | 0.01 | |
| C151 | 1-101-006-00 | 0.047 | |
| C152 | 1-123-319-00 | 47 16V elect | |
| C153, 154 | 1-102-824-00 | 470p | |
| C155 | 1-102-978-00 | 220p | |
| C156 | 1-123-316-00 | 10 16V elect | |
| C157 | 1-102-978-00 | 220p | |
| C158 | 1-102-116-00 | 680p | |
| C159 | 1-123-352-00 | 1 50V elect | |
| C161 | 1-123-316-00 | 10 16V elect | |
| C162 | 1-101-006-00 | 0.047 | |
| C166 | 1-123-328-00 | 4.7 25V elect | |
| C167 | 1-123-316-00 | 10 16V elect | |
| C168 | 1-101-005-00 | 0.022 | |
| C169 | 1-101-006-00 | 0.047 | |
| C170 | 1-123-351-00 | 0.47 50V elect | |
| C171 | 1-102-820-00 | 330p | |
| C172 | 1-101-004-00 | 0.01 | |
| C173 | 1-123-351-00 | 0.47 50V elect | |
| C178 | 1-102-116-00 | 680p | |
| C181 | 1-123-318-00 | 33 16V elect | |
| C183 | 1-123-319-00 | 47 16V elect | |
| C184 | 1-123-307-00 | 100 10V elect | |
| C186 | 1-102-981-00 | 300p | |
| C187 | 1-101-004-00 | 0.01 | |
| C189 | 1-123-352-00 | 1 50V elect | |
| C190, 191 | 1-102-822-00 | 390p | |
| C192 | 1-101-006-00 | 0.047 | |
| C193 | 1-101-001-00 | 0.001 | |
| C194 | 1-101-006-00 | 0.047 | |

| Ref. No. | Part No. | Description | Remark |
|---|---|---|---|
| C195, 196 | 1-123-319-00 | 47 16V elect | |
| C197, 198 | 1-101-006-00 | 0.047 | |
| C200 | 1-123-319-00 | 47 16V elect | |
| C204 | 1-101-006-00 | 0.047 | |
| C205 | 1-123-319-00 | 47 16V elect | |
| C207 | 1-123-319-00 | 47 16V elect | |
| C208 | 1-101-006-00 | 0.047 | |
| C210 | 1-123-319-00 | 47 16V elect | |
| C211 | 1-101-006-00 | 0.047 | |
| C212 | 1-108-623-00 | 0.0056 100V mylar | |
| C213 | 1-101-006-00 | 0.047 | |
| C214, 215 | 1-101-059-00 | 510p | |
| C216 | 1-123-306-00 | 47 10V elect | |
| C218 | 1-123-319-00 | 47 16V elect | |
| C224 | 1-101-004-00 | 0.01 | |
| C225 | 1-101-006-00 | 0.047 | |
| C226 | 1-123-319-00 | 47 16V elect | |
| C227 | 1-101-006-00 | 0.047 | |
| C228 | 1-123-319-00 | 47 16V elect | |
| C230 | 1-102-942-00 | 5p | |
| C233 | 1-123-316-00 | 10 16V elect | |
| C234–236 | 1-101-004-00 | 0.01 | |
| C237 | 1-101-006-00 | 0.047 | |
| C240 | 1-101-004-00 | 0.01 | |
| C241, 242 | 1-123-319-00 | 47 16V elect | |
| C243 | 1-123-320-00 | 100 16V elect | |
| C245 | 1-101-006-00 | 0.047 | |
| C247 | 1-123-319-00 | 47 16V elect | |
| C250–254 | 1-101-006-00 | 0.047 | |
| C255 | 1-123-320-00 | 100 16V elect | |
| C257 | 1-123-319-00 | 47 16V elect | |
| C258 | 1-101-006-00 | 0.047 | |
| C259 | 1-123-319-00 | 47 16V elect | |
| C260 | 1-101-006-00 | 0.047 | |
| C261 | 1-123-319-00 | 47 16V elect | |
| C262 | 1-101-006-00 | 0.047 | |
| C263 | 1-101-004-00 | 0.01 | |
| C264 | 1-123-319-00 | 47 16V elect | |
| C266 | 1-123-316-00 | 10 16V elect | |
| C268 | 1-123-328-00 | 4.7 25V elect | |
| C270 | 1-108-555-00 | 0.001 mylar | |
| C271 | 1-102-963-00 | 33p | |
| C272 | 1-123-352-00 | 1 50V elect | |
| CNJ1-4 | 1-536-614-00 | Terminal Board, control panel | |
| ▲CN1001 | 1-508-744-00 | 10P connector | |
| ▲CN1002 | 1-508-797-00 | 4P connector | |
| ▲CN1003 | 1-508-744-00 | 10P connector | |
| ▲CN1004 | 1-508-845-00 | 6P connector | |

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| CN1005 | 1-508-846-00 | 8P connector | |
| CN1006 | 1-508-736-00 | 10P connector | |
| CN1007 | 1-508-849-00 | 8P connector | |
| CN1008 | 1-508-910-00 | 12P connector | |
| CN1009 | 1-508-846-00 | 8P connector | |
| CNJ1-4 | 1-536-614-00 | Board, TERMINAL, control panel E-608 | |
| DL001 | 1-415-192-00 | Delay Line | 127.886 μsec |
| DL002 | 1-415-203-00 | Delay Line | |
| DL003 | 1-415-148-00 | Delay Line | |
| DL004 | 1-415-204-00 | Delay Line | |
| L001 | 1-407-177-XX | 470μH | |
| L002 | 1-407-168-XX | 82μH | |
| L003 | 1-407-160-XX | 18μH | |
| L004 | 1-407-171-XX | 150μH | |
| L005 | 1-407-170-XX | 120μH | |
| L006 | 1-407-172-XX | 180μH | |
| L007 | 1-407-170-XX | 120μH | |
| L008 | 1-407-161-XX | 22μH | |
| L009 | 1-407-167-XX | 68μH | |
| L011 | 1-407-160-XX | 18μH | |
| L012 | 1-407-167-XX | 68μH | |
| L013 | 1-407-171-XX | 150μH | |
| L014 | 1-407-165-XX | 47μH | |
| L015 | 1-407-169-XX | 100μH | |
| L016 | 1-407-171-XX | 150μH | |
| L017 | 1-407-168-XX | 82μH | |
| L018, 019 | 1-407-160-XX | 18μH | |
| L020 | 1-407-166-XX | 56μH | |
| L021 | 1-407-161-XX | 22μH | |
| L022 | 1-407-168-XX | 82μH | |
| L023, 024 | 1-407-170-XX | 120μH | |
| L025 | 1-407-188-XX | 6.8μH | |
| L026 | 1-407-165-XX | 47μH | |
| L027 | 1-407-189-XX | 8.2μH | |
| L028 | 1-407-177-XX | 470μH | |
| L029, 030 | 1-407-167-XX | 68μH | |
| L031 | 1-407-177-XX | 470μH | |
| L032 | 1-407-195-XX | 1μH | |
| L033 | 1-407-167-XX | 68μH | |
| L034 | 1-407-191-XX | 470μH | |
| L036 | 1-407-161-XX | 22μH | |
| L050 | 1-407-177-XX | 470μH | |
| L053 | 1-407-169-XX | 100μH | |
| L055 | 1-407-204-XX | 6.8μH | |
| LV001 | 1-407-569-XX | COMB FILTER | |

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| R013 | 1-246-791-00 | 4.7k 1/8W | carbon |
| R055 | 1-246-795-00 | 10k 1/8W | carbon |
| R105 | 1-244-860-00 | 300 1/2W | carbon |
| R111, 112 | 1-244-853-00 | 150 1/2W | carbon |
| ⚠ R138 | 1-247-033-00 | 100 1/8W | carbon (nonflammable) |
| R272 | 1-210-829-00 | 4.7M 1/4W | composition |
| R277 | 1-246-795-00 | 10k 1/8W | carbon |
| R279 | 1-246-783-00 | 1k 1/8W | carbon |
| R296 | 1-246-771-00 | 100 1/8W | carbon |
| R308 | 1-246-775-00 | 220 1/8W | carbon |
| R355 | 1-244-839-00 | 39 1/2W | carbon |
| R365 | 1-246-771-00 | 100 1/8W | carbon |
| R369 | 1-246-771-00 | 100 1/8W | carbon |
| RV001 | 1-224-645-XX | 10k, adjustable | |
| RV002 | 1-224-643-XX | 2.2k, adjustable | |
| RV003 | 1-224-641-XX | 470, adjustable | |
| RV004 | 1-224-642-XX | 1k, adjustable | |
| RV005 | 1-224-647-XX | 47k, adjustable | |
| RV006 | 1-224-644-XX | 4.7k, adjustable | |
| RV008 | 1-224-643-XX | 2.2k, adjustable | |
| RV010 | 1-224-642-XX | 1k, adjustable | |
| RV014 | 1-224-643-XX | 2.2k, adjustable | |
| RV015 | 1-224-644-XX | 4.7k, adjustable | |
| RV016 | 1-224-646-XX | 22k, adjustable | |
| RV017 | 1-224-645-XX | 10k, adjustable | |
| RV018 | 1-224-642-XX | 1k, adjustable | |
| RV019 | 1-224-641-XX | 470, adjustable | |
| RV020, 021 | 1-224-642-XX | 1k, adjustable | |
| RV022 | 1-224-552-00 | 470k, adjustable | |
| RV024 | 1-224-643-XX | 2.2k, adjustable | |
| RV025 | 1-226-497-00 | 100k, variable | |
| RV026 | 1-224-648-XX | 100k, adjustable | |
| S001 | 1-552-820-00 | Slide | |
| T002 | 1-409-321-00 | TRAP | |
| T003 | 1-409-320-00 | 5.5MHz TRAP | |
| T004 | 1-425-981-00 | REC C BPT | |
| T005 | 1-425-785-21 | BAT | |
| T006 | 1-405-669-00 | PST | |
| T007 | 1-405-802-00 | 4.43MHz TUNING | |
| T008 | 1-405-803-00 | 4.43MHz TUNING | |
| T009 | 1-425-982-00 | BPT | |
| T010 | 1-411-106-00 | TUNING | |
| T011 | 1-426-027-00 | EQT-2 | |
| X001 | 1-527-345-00 | Crystal, 4.43MHz | |
| X002 | 1-527-353-00 | Crystal, 4.43MHz | |

# CHASSIS

## CHASSIS

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ♦ CN9501 | 1-561-263-00 | CONNECTOR, CAMERA | E-605 |
| L9501 | 1-543-145-00 | TAKE-UP sensor | E-501 |
| L9502 | 1-543-145-00 | SUPPLY sensor | E-301 |
| M9502 | 8-838-008-00 | CAPSTAN MOTOR, BHF-1100D | E-456 |
| S9501 | 1-552-663-00 | Miniature, CASSETTE IN | E-551 |
| S9502 | 1-552-665-00 | Miniature, THREADING END | E-453 |
| S9503 | 1-552-822-00 | Slide, MEMORY | E-303 |
| ⚠S9504 | 1-516-277-00 | Push, POWER | E-209 |
| ⚠S9505 | 1-553-125-00 | Slide, VOLTAGE SELECTOR | E-602 |
| ⚠SL9501 | 1-454-213-00 | Solenoid, EJECT | E-101 |
| ⚠SL9502 | 1-454-216-00 | Solenoid, REVIEW | E-104 |
| ⚠SL9503 | 1-454-215-00 | Solenoid, CUE | E-103 |
| ⚠SL9504 | 1-454-214-00 | Solenoid, FWD | E-102 |
| ⚠SL9505 | 1-454-217-00 | Solenoid, PINCH | E-451 |
| ⚠SL9506 | 1-454-185-21 | Solenoid, BRAKE | E-401 |
| ⚠SL9507 | 1-454-229-00 | Solenoid, SELECT | E-402 |
| ⚠ | 1-413-045-00 | Switching regulator, SR-08 | E-203 |
| ⚠ | 1-463-296-00 | Antenna booster BT-971 | E-155 |
| ⚠ | 1-464-105-00 | RF Modulator | E-158 |
| ⚠ | 1-509-546-00 | 3P INLET | E-603 |
|  | 1-548-534-00 | TAPE COUNTER | E-302 |
| ♦ | 1-555-110-00 | PIN CABLE (TU-11 BOARD to Antenna booster) |  |
| ♦ | 1-555-147-00 | 2P CONNECTOR ASS'Y (S9504 to LF-11 BOARD CN2) |  |
| ♦ | 1-555-148-00 | 2P CONNECTOR ASS'Y (S9504 to LF-11 BOARD CN3) |  |
| ♦ | 1-555-149-00 | 3P CONNECTOR ASS'Y (3P INLET to LF-11 BOARD CN1) |  |
| ♦ | 1-555-150-00 | 3P CONNECTOR ASS'Y (FS-6 BOARD CN6 to LF-11 BOARD CN5) |  |
| ♦ | 1-555-151-00 | 3P CONNECTOR ASS'Y (FS-6 BOARD CN8 to VOLTAGE SELECTOR) |  |
| ♦ | 1-555-152-00 | 3P CONNECTOR ASS'Y (FS-6 BOARD CN7 to VOLTAGE SELECTOR) |  |

## 1/4 WATT CARBON RESISTORS

| Ω | *Part No.* | Ω | *Part No.* | Ω | *Part No.* | Ω | *Part No.* | Ω | *Part No.* | Ω | *Part No.* | Ω | *Part No.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.0 | 1-246-401-00 | 10 | 1-246-425-00 | 100 | 1-246-449-00 | 1.0k | 1-246-473-00 | 10k | 1-246-497-00 | 100k | 1-246-521-00 | 1.0M | 1-246-545-00 |
| 1.1 | 1-246-402-00 | 11 | 1-246-426-00 | 110 | 1-246-450-00 | 1.1k | 1-246-474-00 | 11k | 1-246-498-00 | 110k | 1-246-522-00 | 1.1M | 1-210-814-00 |
| 1.2 | 1-246-403-00 | 12 | 1-246-427-00 | 120 | 1-246-451-00 | 1.2k | 1-246-475-00 | 12k | 1-246-499-00 | 120k | 1-246-523-00 | 1.2M | 1-210-815-00 |
| 1.3 | 1-246-404-00 | 13 | 1-246-428-00 | 130 | 1-246-452-00 | 1.3k | 1-246-476-00 | 13k | 1-246-500-00 | 130k | 1-246-524-00 | 1.3M | 1-210-816-00 |
| 1.5 | 1-246-405-00 | 15 | 1-246-429-00 | 150 | 1-246-453-00 | 1.5k | 1-246-477-00 | 15k | 1-246-501-00 | 150k | 1-246-525-00 | 1.5M | 1-210-817-00 |
| 1.6 | 1-246-406-00 | 16 | 1-246-430-00 | 160 | 1-246-454-00 | 1.6k | 1-246-478-00 | 16k | 1-246-502-00 | 160k | 1-246-526-00 | 1.6M | 1-210-818-00 |
| 1.8 | 1-246-407-00 | 18 | 1-246-431-00 | 180 | 1-246-455-00 | 1.8k | 1-246-479-00 | 18k | 1-246-503-00 | 180k | 1-246-527-00 | 1.8M | 1-210-819-00 |
| 2.0 | 1-246-408-00 | 20 | 1-246-432-00 | 200 | 1-246-456-00 | 2.0k | 1-246-480-00 | 20k | 1-246-504-00 | 200k | 1-246-528-00 | 2.0M | 1-210-820-00 |
| 2.2 | 1-246-409-00 | 22 | 1-246-433-00 | 220 | 1-246-457-00 | 2.2k | 1-246-481-00 | 22k | 1-246-505-00 | 220k | 1-246-529-00 | 2.2M | 1-210-821-00 |
| 2.4 | 1-246-410-00 | 24 | 1-246-434-00 | 240 | 1-246-458-00 | 2.4k | 1-246-482-00 | 24k | 1-246-506-00 | 240k | 1-246-530-00 | 2.4M | 1-244-754-00 |
| 2.7 | 1-246-411-00 | 27 | 1-246-435-00 | 270 | 1-246-459-00 | 2.7k | 1-246-483-00 | 27k | 1-246-507-00 | 270k | 1-246-531-00 | 2.7M | 1-244-755-00 |
| 3.0 | 1-246-412-00 | 30 | 1-246-436-00 | 300 | 1-246-460-00 | 3.0k | 1-246-484-00 | 30k | 1-246-508-00 | 300k | 1-246-532-00 | 3.0M | 1-244-756-00 |
| 3.3 | 1-246-413-00 | 33 | 1-246-437-00 | 330 | 1-246-461-00 | 3.3k | 1-246-485-00 | 33k | 1-246-509-00 | 330k | 1-246-533-00 | 3.3M | 1-244-757-00 |
| 3.6 | 1-246-414-00 | 36 | 1-246-438-00 | 360 | 1-246-462-00 | 3.6k | 1-246-486-00 | 36k | 1-246-510-00 | 360k | 1-246-534-00 | 3.6M | 1-244-758-00 |
| 3.9 | 1-246-415-00 | 39 | 1-246-439-00 | 390 | 1-246-463-00 | 3.9k | 1-246-487-00 | 39k | 1-246-511-00 | 390k | 1-246-535-00 | 3.9M | 1-244-759-00 |
| 4.3 | 1-246-416-00 | 43 | 1-246-440-00 | 430 | 1-246-464-00 | 4.3k | 1-246-488-00 | 43k | 1-246-512-00 | 430k | 1-246-536-00 | 4.3M | 1-244-760-00 |
| 4.7 | 1-246-417-00 | 47 | 1-246-441-00 | 470 | 1-246-465-00 | 4.7k | 1-246-489-00 | 47k | 1-246-513-00 | 470k | 1-246-537-00 | 4.7M | 1-244-761-00 |
| 5.1 | 1-246-418-00 | 51 | 1-246-442-00 | 510 | 1-246-466-00 | 5.1k | 1-246-490-00 | 51k | 1-246-514-00 | 510k | 1-246-538-00 | 5.1M | 1-244-762-00 |
| 5.6 | 1-246-419-00 | 56 | 1-246-443-00 | 560 | 1-246-467-00 | 5.6k | 1-246-491-00 | 56k | 1-246-515-00 | 560k | 1-246-539-00 |  |  |
| 6.2 | 1-246-420-00 | 62 | 1-246-444-00 | 620 | 1-246-468-00 | 6.2k | 1-246-492-00 | 62k | 1-246-516-00 | 620k | 1-246-540-00 |  |  |
| 6.8 | 1-246-421-00 | 68 | 1-246-445-00 | 680 | 1-246-469-00 | 6.8k | 1-246-493-00 | 68k | 1-246-517-00 | 680k | 1-246-541-00 |  |  |
| 7.5 | 1-246-422-00 | 75 | 1-246-446-00 | 750 | 1-246-470-00 | 7.5k | 1-246-494-00 | 75k | 1-246-518-00 | 750k | 1-246-542-00 |  |  |
| 8.2 | 1-246-423-00 | 82 | 1-246-447-00 | 820 | 1-246-471-00 | 8.2k | 1-246-495-00 | 82k | 1-246-519-00 | 820k | 1-246-543-00 |  |  |
| 9.1 | 1-246-424-00 | 91 | 1-246-448-00 | 910 | 1-246-472-00 | 9.1k | 1-246-496-00 | 91k | 1-246-520-00 | 910k | 1-246-544-00 |  |  |

Betamax

VIDEOCASSETTE RECORDER

# SL-C7E

No. 1
March, 1980

# SUPPLEMENT

## Subject; Addition of a Model for Asia, Africa and Australia.

The circuit and mechanical structure of the Model for Asia, Africa and Australia and the Model for AEP are almost identical.
Refer to the SL-C7E ( AEP ) service manual for operation and service procedure not contained in this publication.

### 1. Added and Changed Parts List

| Description | Asia, Africa, Australia | AEP |
|---|---|---|
| Cord, power | 1-551-646-00 | ——— |
| Label, F mark | ——— | ♠ 3-656-407-00 |
| Label, explanation (DUTCH) | ——— | 3-662-336-00 |
| Label, explanation (SWEDISH) | ——— | 3-662-337-00 |
| Label, approval | 3-703-274-00 | ——— |
| Instruction | ——— | 3-794-584-11 |
| Manual, instant information | ——— | 3-794-586-11 |
| Manual, instant information | ——— | 3-794-603-11 |
| Label, DEMKO | ——— | 4-310-380-00 |

- Items marked "♠" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

**SONY**®
**SERVICE MANUAL**

Betamax

VIDEOCASSETTE RECORDER

# SL-C7E

No.2
April. 1980

# SUPPLEMENT

Subject: Alignment

## SPECIFICATIONS

### General

| | |
|---|---|
| **Video recording system:** | Rotary two-head helical scanning |
| **Video signal:** | CCIR standards, PAL colour |
| **Storage temperature:** | −20°C to +65°C (−4°F to +149°F) |
| **Operating temperature:** | 5°C to 40°C (41°F to 104°F) |
| **Aerial:** | 75-ohm, asymmetrical aerial socket |
| **Channel coverage:** | VHF Western European Channels E2–12<br>UHF Western European Channels E21–68<br>(a total of up to 12 preselected channels) |
| **RF output signal:** | UHF channels E30 to E39 (variable)<br>75 ohms, unbalanced |
| **Power requirements:** | 110–127V, 220–240V AC ± 10% (adjustable), 50/60 Hz |
| **Power consumption:** | 45 W |
| **Dimensions:** | 485 x 163 x 379 mm (w/h/d)<br>($19^1/8$ x $6^1/2$ x 15 inches) |
| **Weight:** | 15.5 kg (34 lb 3 oz) |

### Video

| | |
|---|---|
| **Input:** | VIDEO IN: BNC connector<br>1.0 V (p-p) $^{+1.0}_{-0.5}$ V (p-p), 75 ohms unbalanced, sync negative |
| **Output:** | VIDEO OUT: BNC connector<br>1.0 V (p-p) ±0.1 V (p-p), 75 ohms unbalanced, sync negative |
| **Horizontal resolution:** | Colour: 260 lines<br>B/W: 300 lines |
| **Signal-to-noise ratio:** | Colour: Better than 40 dB<br>B/W: Better than 43 dB |

### Audio

| | |
|---|---|
| **Input:** | AUDIO IN: Phono connector<br>47 kohms, −10 dBs.<br>MIC: mini jack<br>−60 dBs, suitable for microphone with 600-ohm impedance |
| **Output:** | AUDIO OUT:Phono connector<br>Less than 10 kohms, −5 dBs (47 k ohm load), unbalanced |
| **Frequency response:** | 50 Hz to 10 kHz |
| **Signal-to-noise ratio:** | Better than 40 dB |
| **Audio distortion:** | Less than 4% at 400 Hz |

### Tape transport

| | |
|---|---|
| **Tape speed:** | 18.73 mm/sec. |
| **Maximum recording time:** | 2 hours 10 min (with Sony L-500 cassette)<br>3 hours 15 min (with L-750) |
| **Fast forward/rewind time:** | Within 3 1/2 min. (L-500) |
| **Timer:** | Only for recording<br>Electronic digital timer<br>24-hour-clock cycle<br>2 weeks 4 events |

### Accessories supplied

Remote Commander RMT-200
Betamax Videocassette tape L-500
AC mains lead
75-ohm coaxial cable

### Remote commander

| | |
|---|---|
| **Remote control system:** | Infrared control |
| **Power requirements:** | 6 V dc<br>Battery size AA x 4<br>(IEC battery designation R6) |
| **Dimensions:** | 68 x 34 x 144 mm (w/h/d)<br>($2^3/4$ x $1^3/8$ x $5^3/4$ inches) |
| **Weight:** | 220 g (8 oz)<br>including batteries |
| **Accessory supplied:** | Battery size AA 4 pcs. |

SONY®
SERVICE MANUAL

# TABLE OF CONTENTS

## 1. PREPARATION FOR MECHANICAL SECTION CHECK, ADJUSTMENT, AND REPLACEMENT

1-1. Disassembly . . . . . . . . . . . . . . . . . . . . 1-1
1-2. Notes on Maintenance . . . . . . . . . . . . . . 1-2
1-3. Operating Recorder Without Cassette Installed 1-3
1-4. Stopping Slack Sensor Operation . . . . . . . . 1-3
1-5. Tools and Fixtures Required . . . . . . . . . . . 1-4

## 2. PERIODIC CHECK AND MAINTENANCE

2-1. Maintenance after Repair . . . . . . . . . . . . . 2-1
2-2. Periodic Check Items . . . . . . . . . . . . . . . 2-1
2-3. Others . . . . . . . . . . . . . . . . . . . . . . . . 2-2

## 3. CHECK, ADJUSTMENT, AND, REPLACEMENT PROCEDURES

3-1. Replacement of Video Head Disk Assembly and Eccentricity Adjustment . . . . . . . . . . . . 3-1
3-2. Replacement of Drum Assembly . . . . . . . . 3-2
3-3. Replacement of Capstan DC motor . . . . . . . 3-4
3-4. Replacement and Adjustment of Tension Regulator Arm Plate Assembly and Tension Regulator Band Assembly . . . . . . . . . . . . 3-5
3-4-1. When Tension Regulator Band Assembly is Replaced: . . . . . . . . . . . . . . . . . . . . . 3-5
3-4-2. When Tension Regulator Arm Plate is Replaced: . . . . . . . . . . . . . . . . . . . . . 3-6
3-5. Replacement of Cassette-lift Assembly . . . . . 3-7
3-6. Adjustment of Reel Table Height . . . . . . . . 3-7
3-7. Position Adjustment, Pause Solenoid . . . . . . 3-7
3-8. Position Adjustment of Function Solenoid . . . 3-8
3-8-1. Position Adjustment of PLAY, F.FWD and REW Solenoids . . . . . . . . . . . . . . . . . . . . . 3-8
3-8-2. Position Adjustment fo Cassette Eject Solenoid 3-9
3-9. Adjustment of Threading and Unthreading . . . 3-10
3-9-1. Operation Check of Cassette-in Switch . . . . . 3-10
3-9-2. Position Adjustment of Threading Unit B Assembly and Control Plate . . . . . . . . . . 3-10
3-9-3. Position Adjustment of Gear Pulley Hold Arm Assembly . . . . . . . . . . . . . . . . . . . . 3-11
3-9-4. Adhesion of Brake Shoe . . . . . . . . . . . . . 3-11
3-9-5. Clearance Adjustment of Cassette-lift Assembly Arm . . . . . . . . . . . . . . . . . . . . . . . 3-11
3-9-6. Clearance Adjustment of Ring Arm . . . . . . . 3-12
3-9-7. Check of Unthreading Completion . . . . . . . 3-12
3-10. Position Adjustment of Lid Opener . . . . . . . 3-13
3-11. Replacement and Adjustment of Threading Ring Assembly . . . . . . . . . . . . . . . . . . . . 3-14
3-12. Position Adjustment of Pinch Roller Solenoid . 3-15
3-12-1. Parallelism Adjustment of Pinch Press Lever . . 3-15
3-12-2. Position Adjustment of Pinch Solenoid . . . . . 3-16
3-12-3. Position Adjustment of Slack Sensor Operation . . . . . . . . . . . . . . . . . . . . . 3-16
3-13. Adjustment of Microswitch . . . . . . . . . . . 3-17
3-14. Position Adjustment of Microswitch . . . . . . 3-17
3-14-1. Position Adjustment of Miserase Prevention Microswitch . . . . . . . . . . . . . . . . . . . 3-17
3-14-2. Position Adjustment of Threading End Switch 3-17
3-15. Check of Take-up Torque . . . . . . . . . . . . 3-18
3-16. Check of Cassette Eject Torque . . . . . . . . . 3-18
3-17. Check of Brake Torque . . . . . . . . . . . . . . 3-19
3-17-1. Check of Supply and Take-up Brake Operations . . . . . . . . . . . . . . . . . . . . . 3-19
3-17-2. Check of Supply and Take-up Brake Torque . . 3-19
3-17-3. Check and Adjustment of Soft Brake Torque . 3-20
3-18. Adjustment of FWD Back Tension . . . . . . . 3-20
3-19. Adjustment of Tracking . . . . . . . . . . . . . 3-20
3-19-1. Adjustment of Tape Path . . . . . . . . . . . . . 3-22
3-19-2. Adjustment of Exit Side Tracking after ACE Assembly Replacement . . . . . . . . . . . . . 3-23
3-19-3. Audio Head Azimuth Adjustment . . . . . . . . 3-24
3-19-4. Position Adjustment of ACE Assembly . . . . . 3-24
3-19-5. Video Head Dihedral Adjustment . . . . . . . . 3-24

## 4. ELECTRICAL ALIGNMENT

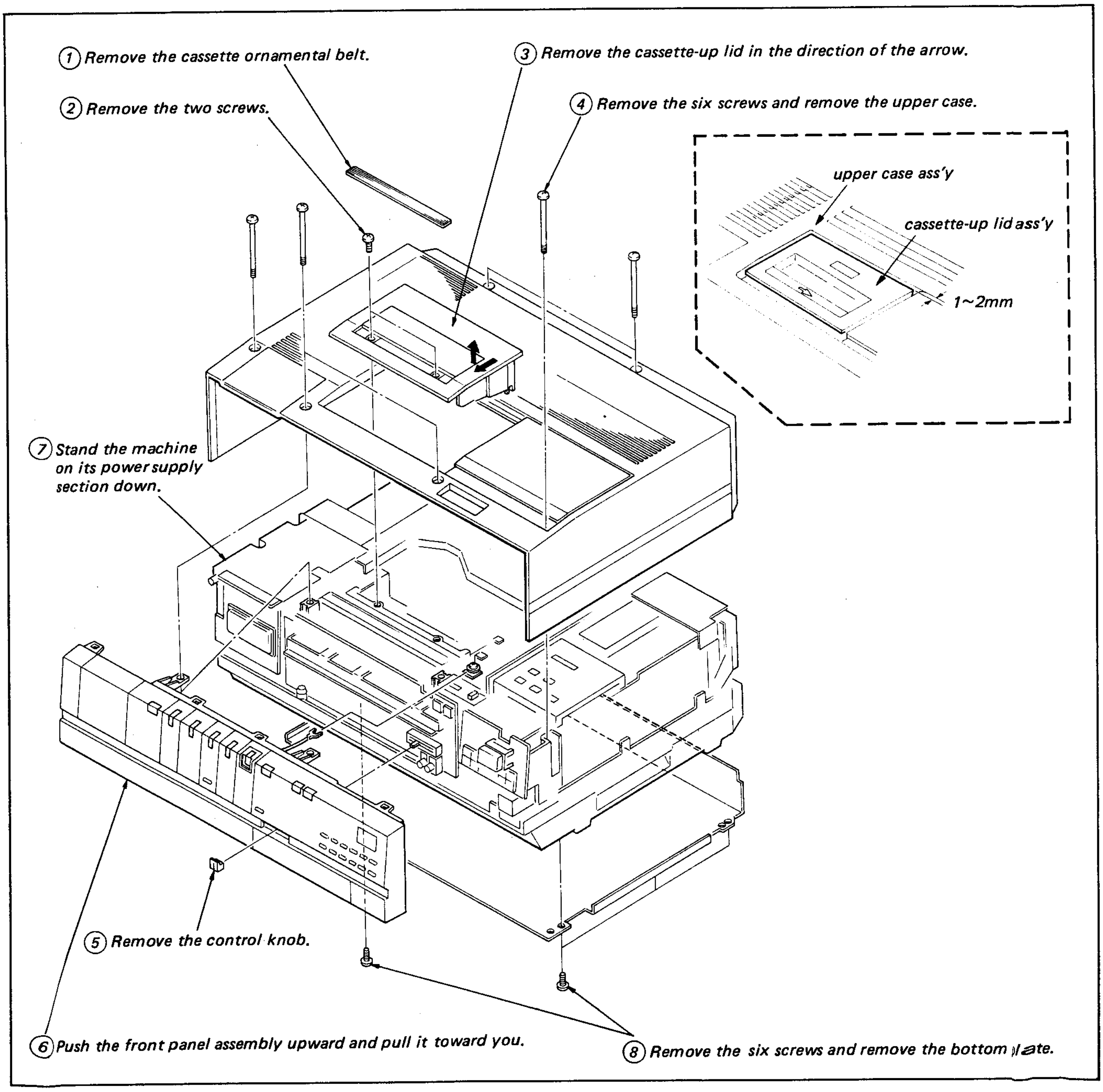
4-1. Power Supply Alignment and Check . . . . . . 4-2
4-2. System Control Alignment and Check (SY-10 and SY-11 board) . . . . . . . . . . . . 4-3
4-3. Servo System Alignment . . . . . . . . . . . . . 4-3
4-3-1. Drum Servo System Alignment . . . . . . . . . 4-3
4-3-2. Capstan Servo System Alignment . . . . . . . . 4-5
4-3-3. Auto matic Frame-by-Frame Feed Circuit Adjustment . . . . . . . . . . . . . . . . . . . . 4-5
4-4. Video System Alignment (CR-4,YC-6 and RF-2 boards) . . . . . . . . . . . . . . . . . 4-6
4-5. Audio System Alignment (AS-3 board) . . . . . 4-12
4-6. Tuner Block System Alignment . . . . . . . . . 4-14
4-7. Timer Alignment (TM-10 board) . . . . . . . . . 4-14

# SECTION 1
# PREPARATION FOR MECHANICAL SECTION CHECK, ADJUSTMENT, AND REPLACEMENT

## 1-1. DISASSEMBLY

### 1. Removal and Re-assembly of Cabinet

1. Removal of outer cabinet perform procedures ① to ⑧
2. Note on assembling
   - (i) When the upper case with the cassette-up lid is to be attached, attach the upper case while the cassette-up is raised.
   - (ii) Attach the cassette-up lid so that the clearance between the cassette-up lid and the upper case is 1 to 2mm.


① *Remove the cassette ornamental belt.*

② *Remove the two screws.*

③ *Remove the cassette-up lid in the direction of the arrow.*

④ *Remove the six screws and remove the upper case.*

⑤ *Remove the control knob.*

⑥ *Push the front panel assembly upward and pull it toward you.*

⑦ *Stand the machine on its power supply section down.*

⑧ *Remove the six screws and remove the bottom plate.*

*Fig. 1-1. Removal and re-assembly of cabinet*

### 2. Tuner-IF Block Removal

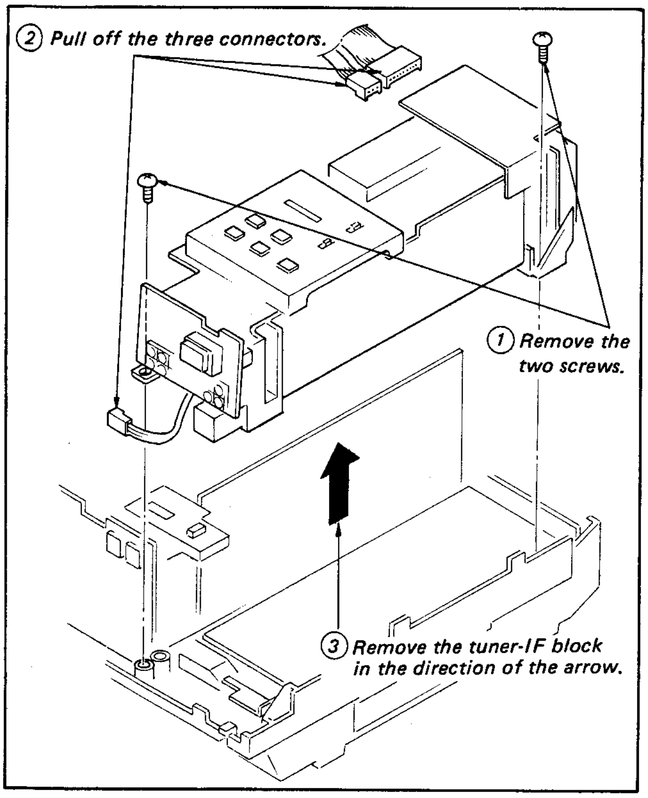

② Pull off the three connectors.
① Remove the two screws.
③ Remove the tuner-IF block in the direction of the arrow.

Fig. 1-2.

### 3. Timer Block Removal

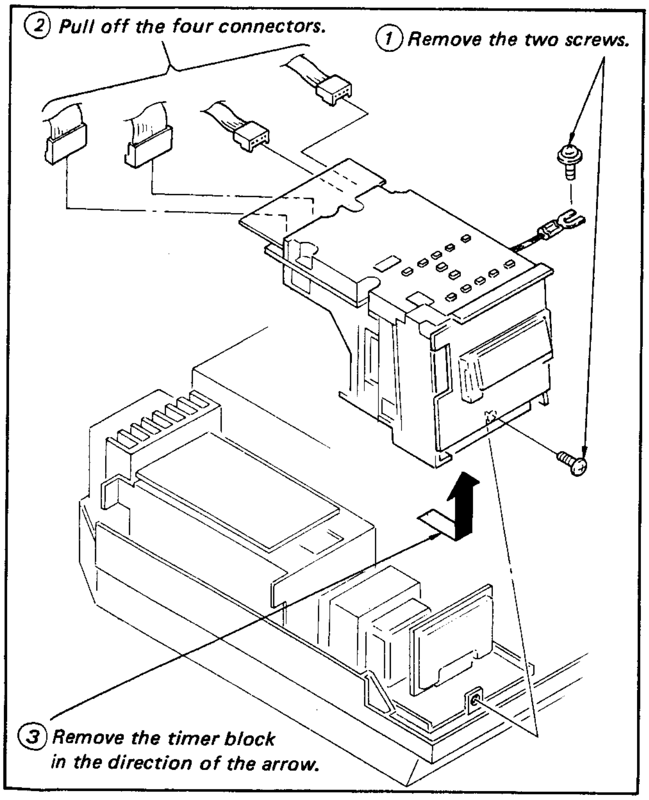

② Pull off the four connectors.
① Remove the two screws.
③ Remove the timer block in the direction of the arrow.

Fig. 1-3.

### 4. YC-6 and AS-3 Board Removal

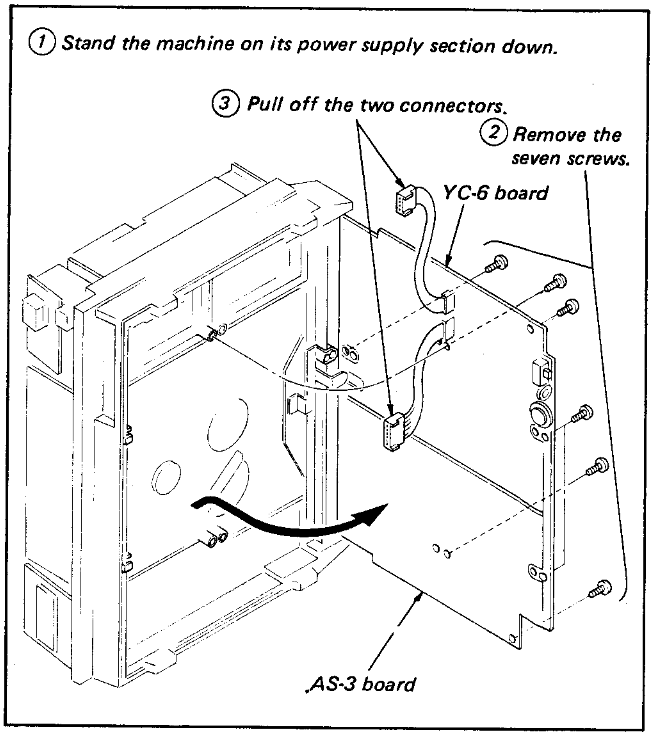

① Stand the machine on its power supply section down.
③ Pull off the two connectors.
② Remove the seven screws.
YC-6 board
AS-3 board

Fig. 1-4.

## 1-2. NOTES ON MAINTENANCE

1. Never place the machine upside down when the upper case lid has been removed from the machine, with the fan (black) attached on the drum assembly. (Since the fan projects from the chassis surface, an excessive force is applied on the drum if the machine is placed upside down, which could alter the tape movement and the tape interchangeability.)
2. Be sure to install the fan on the drum prior to the tape playback check or the electrical system alignment. If the check or the alignment is performed without the fan installed, the picture on the monitor may bend, as shown in Fig. 1-5.
3. The KR5-1H alignment tape is effective in making the tape path adjustment easy, as compared with the former alignment tapes.

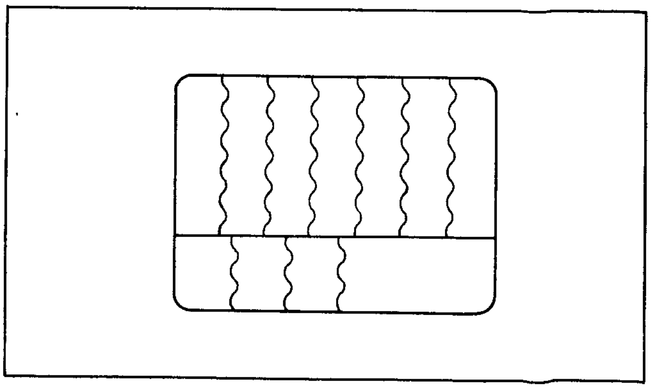


Fig. 1-5.

## 1-3. OPERATING RECORDER WITHOUT CASSETTE INSTALLED

1. To Set Up Threading Completion State Without Cassette and Cassette Lift Assembly.
(This state is called "STOP mode" in this guide.)
   - Push down the cassette delection lever until the threading ring stops. (See Fig. 1-6.)

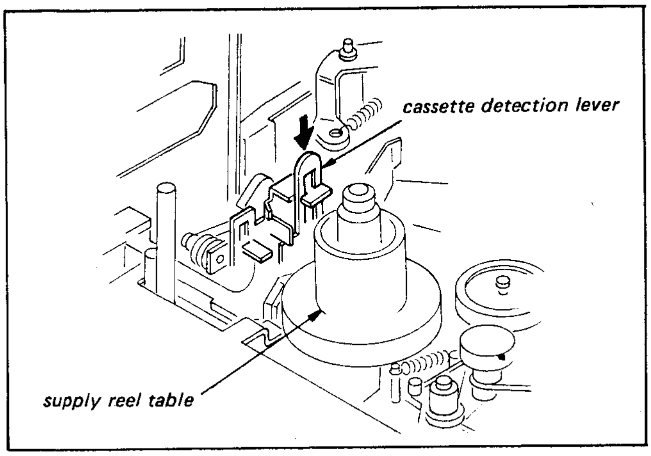

cassette detection lever
supply reel table

*Fig. 1-6.*

2. To Set Up PLAY, FAST FWD, And REWIND States Without Cassette Installed
   - Capture the cassette detection lever with an alligator clip, or an equivalent, as shown in Fig. 1-7, to place the cassette detection switch, mounted on the chassis, into the ON state. Then a desired state of operation can be set up by depressing the function button for the desired state. But note that the PLAY function button must be depressed after performing the procedures for stopping the slack sensor operation described in Section 1-4.

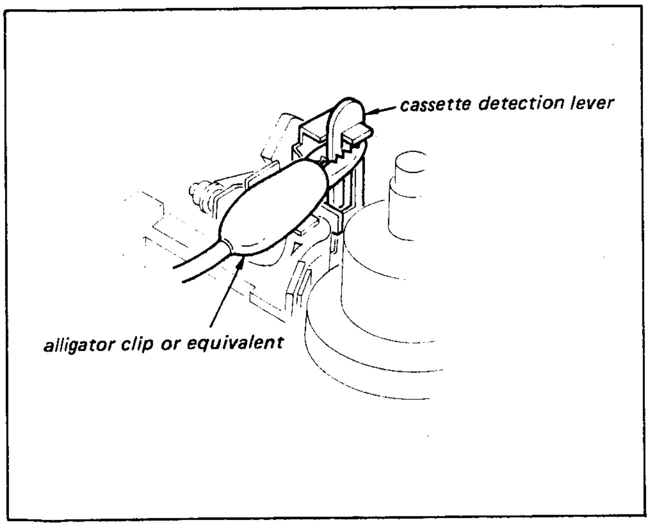

cassette detection lever
alligator clip or equivalent

*Fig. 1-7.*

3. To Set Up EJECT Mode Without a Cassette:

**Note:** Remove the alligator clip that captured cassette detection lever in Step 2.

   - Keep pressing the EJECT button until the unthreading is completed.

4. To Set Up RECORD Mode Without a Cassette:
   - Capture the cassette detection lever with an alligator clip as shown in Fig. 1-7, manually depress the erasing protection plate as shown in Fig. 1-8, and perform the procedure in Section 1-4, "Stopping Slack Sensor Operation". Then depress the RECORD button or the AUDIO DUB button.

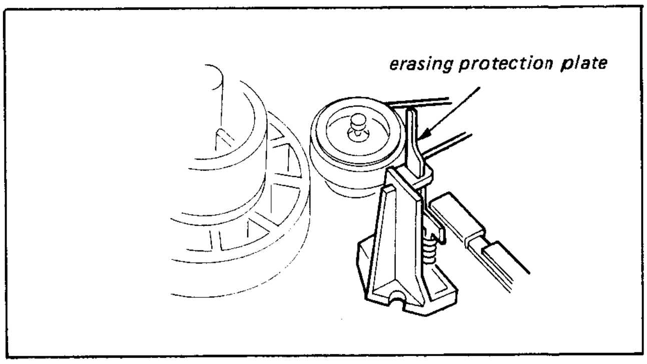

erasing protection plate

*Fig. 1-8.*

## 1-4. STOPPING SLACK SENSOR OPERATION

1. Insert a toothpick, or something like a matchstick whose point is sharpened, into the hole on the CN-6 board as shown in Fig. 1-9 to stop the movement of the slack sensor arm. A plastic pick would be preferred to the wooden one.

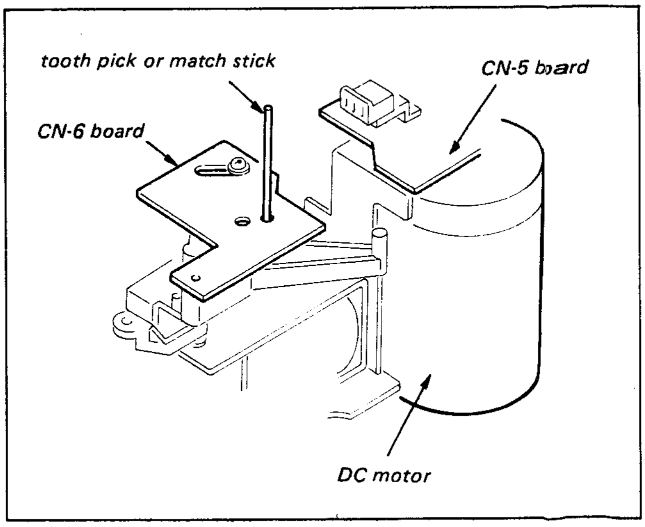

tooth pick or match stick
CN-5 board
CN-6 board
DC motor

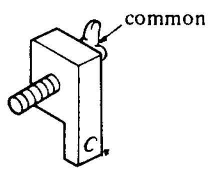
*Fig. 1-9.*

## 1-5. TOOLS AND FIXTURES REQUIRED

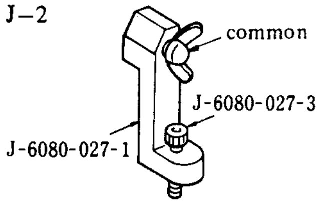
| Ref. No. | Name | Part Code | Carved Jig No. | Use and Remarks |
|---|---|---|---|---|
| J-1 | Upper drum eccentricity adjustment jig | J-6080-027-2 | SL-0027 | Components of the SL-0012 which has been used are utilized as eccentricity adjustment jigs (J-3 and J-4) of the video head disc. |
| J-2 | Upper drum eccentricity adjustment jig | J-6080-027-1<br>J-6080-027-3 | | |
| J-3 | Upper drum eccentricity adjustment jig | J-6080-012-A | SL-0012 | |
| J-4 | Upper drum eccentricity adjustment jig | | | |
| J-5 | Reel table tension gauge | J-6080-011-A | SL-0011 | For torque measurements |
| J-6 | FWD back tension measurement jig | J-6080-002-A | SL-0002 | For FWD back tension measurement |
| J-7 | Sector type gauge (for 50 g) | 7-732-050-20 | ——— | For back tension and torque measurements |
| J-8 | Sector type gauge (for 100 g) | 7-732-050-30 | ——— | |
| J-9 | Parallel board | J-6086-570-A | SL-0657 | For zenith adjustment of the audio/CTL head |
| J-10 | Inspection mirror (handle) | 7-723-902-01 | ——— | For tape path adjustment and tape running check Be sure to place an order for the handle and the mirror as a set. |
| | Inspection mirror (mirror) | 7-723-902-11 | ——— | |
| J-11 | Dihedral adjustment screw | J-6080-013-A | SL-0013 | For video head dihedral adjustment |
| J-12 | Alignment tape (KR5-1H) | 8-969-995-91 | ——— | For over all adjustments such as tracking and picture quality |
| J-13 | Cleaning fluid | Y-2031-001-0 | ——— | For cleaning |
| J-14 | Chamois | 2-034-697-00 | ——— | For cleaning |
| J-15 | Thickness gauge | 9-911-053-00 | ——— | For checking clearance |
| J-16 | Head demagnetizer | Common | ——— | For video and audio head degaussing (Demagnetizer HE-2 or HE-3) |
| J-17 | Lapping tape | 8-888-004-00 | ——— | For video head cleaning |

**Note:** When the Jig Nos. J-1 and J-2 are ordered, be sure to place an order for these together as a set.

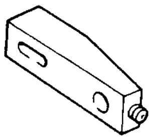
J–1



J–2



J–3



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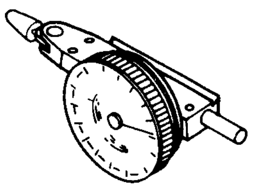

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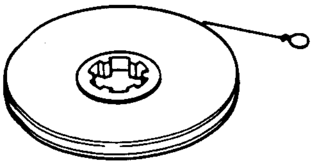
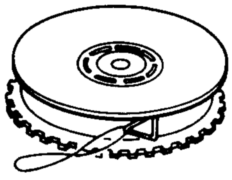
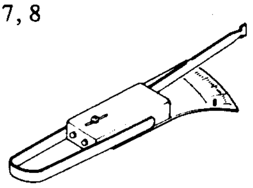


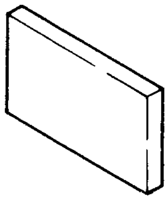
J–6



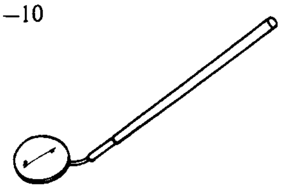
J–7, 8



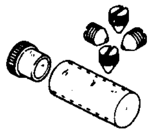
J–9



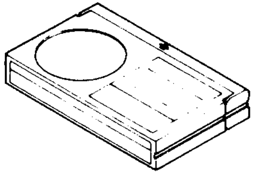
J–10



J–11

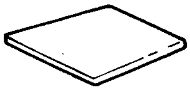


J–12

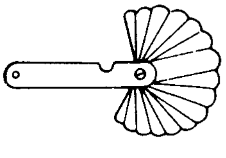


J–13

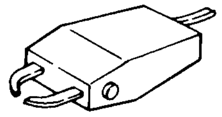
J–14



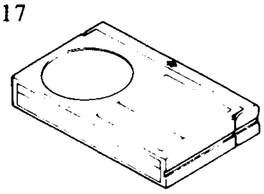
J–15



J–16



J–17



# SECTION 2
# PERIODIC CHECK AND MAINTENANCE

- It is recommended that the following periodic check and maintenance be performed for obtaining the full function and performance of the machine and extending the lives of the machine and tape.

## 2-1. MAINTENANCE AFTER REPAIR

The following maintenance items must be performed after repair of the machine without regard to the operating hours of the machine.

(1) Cleaning of the video head disk assembly
  - Press chamois saturated with the cleaning fluid or isopropyl alcohol lightly on the video head disk assembly and turn the fan on the drum slowly by hand for cleaning. (Never try to clean the video head disk assembly with the motor running.)
  - Never move the chamois vertically against the head tips for cleaning, or the head tips will be damaged.

(2) Cleaning of the tape movement system
  - Clean the surfaces which the tape contacts during its movement (the tape guides, drum assembly, capstan, and pinch roller) with chamois saturated with the cleaning fluid or isopropyl alcohol.

(3) Cleaning of the driving system
  - Clean the driving elements (such as belts, idlers, and reel table surfaces) with a piece of cloth saturated with the cleaning fluid or isopropyl alcohol.

## 2-2. PERIODIC CHECK ITEMS

Perform the maintenance and check listed on the table below, according to user's operating hours.

○ Cleaning ◎ Lubrication ★ Replacement ☆ Confirmation

| Maintenance & Check | | Replacement Part No. | 500 | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 | 3,500 | 4,000 | 4,500 | 5,000 | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Operating Hour (H) | | | | | | | | | | | |
| Tape Movement System | Cleaning of tape movement system | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | This cleaning must be done whenever a repair is made. |
| | Cleaning & degaussing of ACE ass'y | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| | Cleaning & degaussing of video head disk ass'y | A-6762-038-A | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | The life of a head varies, depending on operational conditions and methods. |
| Driving System | Lubrication to thrust retainer | — | – | ◎ | – | ◎ | – | ◎ | – | ◎ | – | ◎ | Apply a drop of oil (such as sewing machine oil) on each of upper and lower bearings. |
| | Lubrication to thrust bearing (under reel table) | — | – | – | ◎ | – | – | ◎ | – | – | ◎ | – | Remove reel table and apply a drop of oil (such as sewing machine oil) on thrust bearing. |
| | Cleaning & replacement of capstan belt | 3-659-351-00 | ○ | ○ | ★ | ○ | ○ | ★ | ○ | ○ | ★ | ○ | •Cleaning must be done whenever repair is made.<br>•Replacement must be done depending on operating hours on the table, or every two years. |
| | Cleaning & replacement of belts other than capstan belt | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ★ | ○ | ○ | |
| | Replacement of FWD limiter | X-3653-310-0 | – | – | ★ | – | – | ★ | – | – | ★ | – | |
| | Cleaning of iron core and opening of solenoid | — | – | – | – | ○ | – | – | – | ○ | – | – | Wipe iron core and opening of solenoids with a dry cloth. |
| Performance Confirmation | Abnormal sound | — | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ | Adjust or replace the section which makes abnormal sound. |
| | Measurement of FWD back tension | — | – | ☆ | – | ☆ | – | ☆ | – | ☆ | – | ☆ | Confirmation must be made according to Section 3-18.<br>Specified value: 35 to 45g. (when measured with jig tape) |
| | Confirmation of brake system | — | – | ☆ | – | ☆ | – | ☆ | – | ☆ | – | ☆ | Confirmation must be made according to Section 3-17. |
| | Confirmation of record & playback functions | — | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ | Perform the confirmation whenever repair is made. |

- Belts other than capstan belt

FWD belt : 3-653-324-00
Threading belt : 3-659-301-00
EJECT belt : 3-659-397-00
FF belt : 3-659-471-00
Counter belt : 3-659-485-00

**(Note** on Overhaul)

A part replacement must be done in the overhal operation, referring to the listed items. The replacement periods of the motor and the head which are not included in the chart items are as follows.

Full erase head . . . . . about 4,000 operating hours
Capstan motor . . . . . about 2,000 operating hours

## 2-3. OTHERS

(1) Lubricating Oil

- Be careful in applying oil to any parts.
  Do not permit the oil to coat any surface that is touched by the tape, heads, or drive belts.

- Be sure to use SONY oil (or equivalent) for lubrication. (Various troubles will be caused, if a different viscosity oil is used.)
  SONY Oil: Part No. 7-661-018-01
  (Mitsubishi Diamond Oil #440)
  OR THE EQUIVALENT OF SEWING MACHINE TYPE OIL

- Use the oil without dust or other foreign material for the bearing lubrication. (If an oil including dust and others is used, friction and burning of the bearing are apt to occur)

- The quantity of "a drop of oil" is about the quantity that will attach to the tip of a 2 mm diameter stick, as shown in the figure.

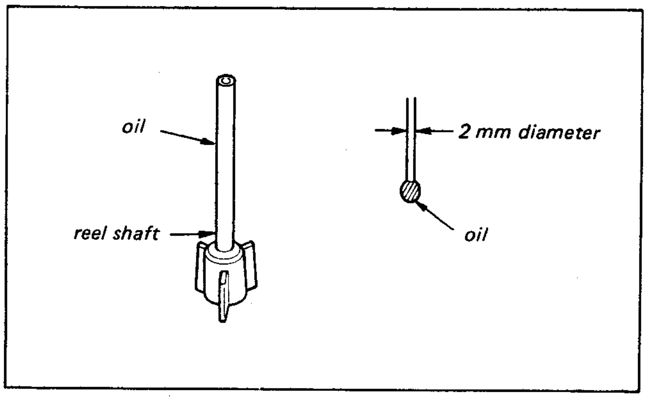


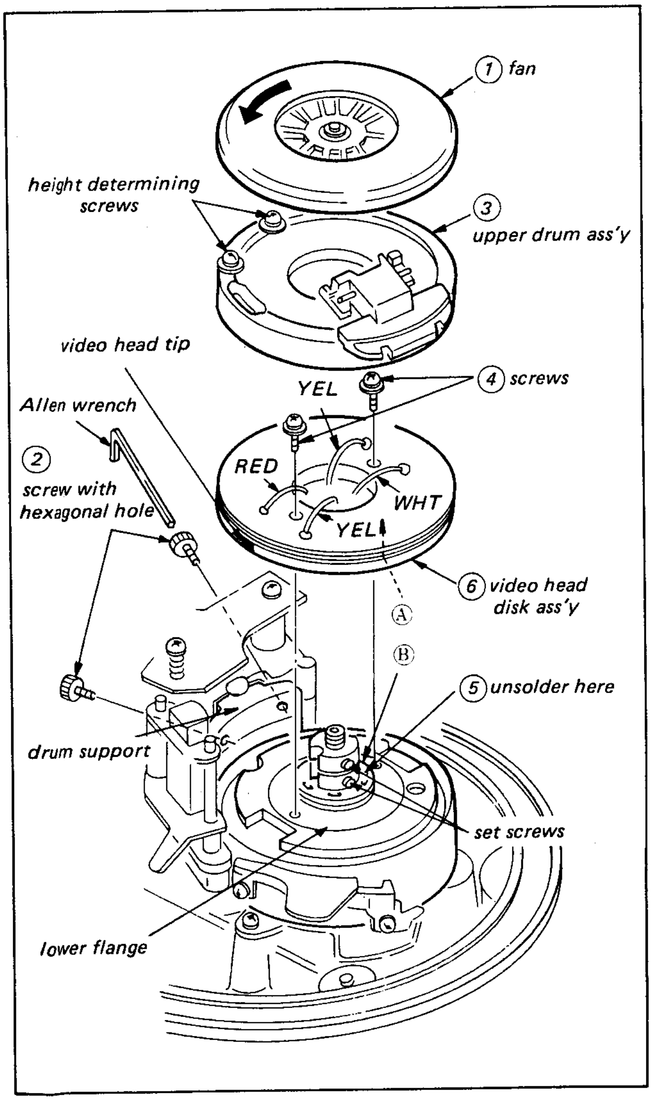
*Fig. 2-1.*

# SECTION 3
# CHECK, ADJUSTMENT, AND REPLACEMENT PROCEDURES

## 3-1. REPLACEMENT OF VIDEO HEAD DISK ASSEMBLY AND ECCENTRICITY ADJUSTMENT

1. Remove the video head disk assembly, following Steps ① to ⑥ shown in Fig. 3-1.

**Note:**
- For removing fan ①, hold video head disk assembly ⑥ (without touching heads) and turn the fan in a counterclockwise direction.
- Never loosen the two setscrews that fasten the lower flange to the drum shaft.
- Never loosen the lower two screws of the drum support.
- Prior to installing the video head disk assembly ⑥, clean surfaces Ⓐ and Ⓑ with a piece of cloth saturated with methanol or isopropyl alcohol.

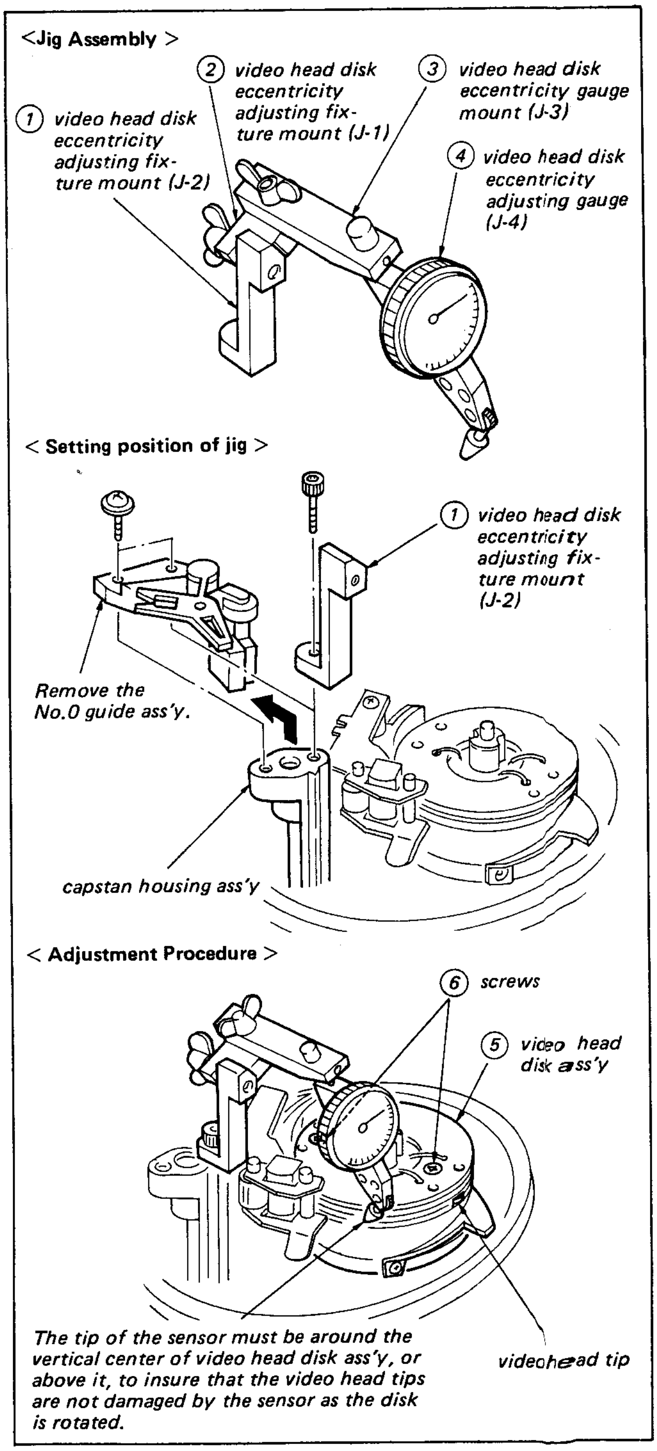


① fan
height determining screws
③ upper drum ass'y
video head tip
YEL
④ screws
Allen wrench
② screw with hexagonal hole
RED
WHT
YEL
⑥ video head disk ass'y
Ⓐ
Ⓑ
⑤ unsolder here
drum support
set screws
lower flange

*Fig. 3-1. Replacement of the video head disk assembly*

2. Install the video head disk assembly tentatively (with two screws only finger-tight) and perform the eccentricity adjustment.

   (i) Combine adjusting fixture parts ①, ②, ③, and ④ as shown in Fig. 3-2. Set the combined fixture on the machine by mounting the eccentricity gauge assembly in the capstan husing assembly. See Fig. 3-2.


**<Jig Assembly>**

② video head disk eccentricity adjusting fixture mount (J-1)
③ video head disk eccentricity gauge mount (J-3)
① video head disk eccentricity adjusting fixture mount (J-2)
④ video head disk eccentricity adjusting gauge (J-4)

**< Setting position of jig >**

① video head disk eccentricity adjusting fixture mount (J-2)
Remove the No.0 guide ass'y.
capstan housing ass'y

**< Adjustment Procedure >**

⑥ screws
⑤ video head disk ass'y
videohead tip

*The tip of the sensor must be around the vertical center of video head disk ass'y, or above it, to insure that the video head tips are not damaged by the sensor as the disk is rotated.*

*Fig. 3-2. Eccentricity adjustment of the video head disk assembly*

(ii) Turn the shaft of the drum counterclockwise slowly with the fingers and adjust the video head disk position so that the variation in the reading of the drum eccentricity adjusting gauge is within 5 $\mu$m during each turn of the drum, by very gently tapping a screwdriver whose blade-tip is against the inner circumference of video head disk assembly ⑤ .

(iii) Tighten the screws ⑥ that secure the video head disk assembly ⑤ alternately and gradually after the eccentricity adjustment is completed. (tightening torque: more than 10 kg.cm.)

(iv) After the screws are tightened, confirm again that the eccentricity deflection is within 5 $\mu$m.

(v) Solder the four leads of the head and remount the upper drum assembly while holding the upper drum height determining screws. (See Fig. 3-1.)

3. Perform the following adjustments after the replacement of the video head disk assembly.

3-11-6. No. 0 guide section assembly adjustment
3-19-1. Tape path adjustment
3-19-4. ACE assembly position adjustment
3-19-5. Video head dihedral adjustment
4-3-1.–2. RF switching position adjustment
4-3-1.–3. REC mode servo lock phase adjustment
4-4-2. Playback amplifier frequency characteristic adjustment (RF-2 board)
4-4-1. Y-FM record current adjustment (RF-2 board)
4-4-16. Chroma record current adjustment (YC-6 board)

## 3-2. REPLACEMENT OF DRUM ASSEMBLY

1. Stand the machine on its left side. Open the YC-6 and AS-3 boards. (Refer to Section 1-1-4.)
2. Remove FF belt ① and drum shield ② shown in Fig. 3-3.
3. Remove two screws ① and connectors ② and ③ shown in Fig. 3-4. The drum assembly can then be removed, by pulling it up.
4. Loosen the rotor assembly by inserting a long-nose pliers or a screwdriver into the two rotor holes shown in Fig. 3-5 and removing the N5$\phi$ nut and SW5$\phi$ washer. Pull off the rotor assembly.
5. Remove the screw mounting the stator assembly (shown in Fig. 3-5) and pull off the stator assembly.
6. Install the rotor assembly and the stator assembly (removed in Steps 4 and 5) onto the new drum assembly.

**Note:** Install the stator assembly so that the 3P connector on the stator assembly fits into the slot of the shield case assembly.

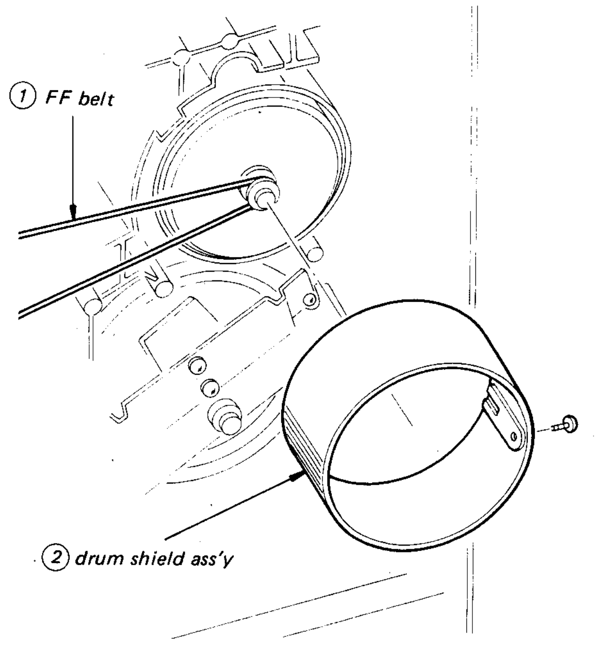


*Fig. 3-3. Replacement of drum assembly (1)*

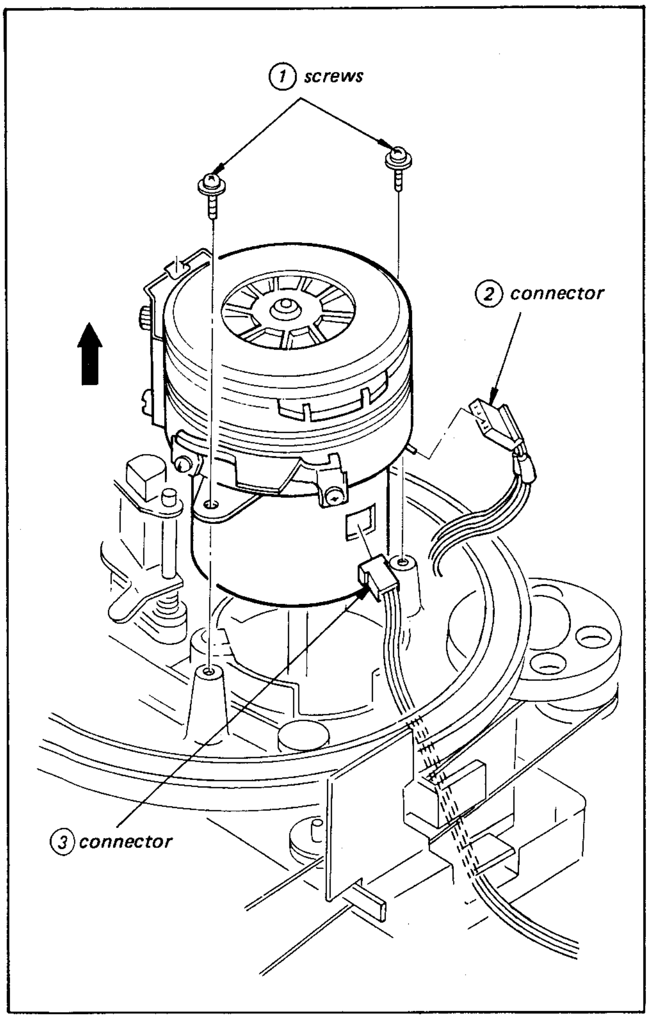

① screws
② connector
③ connector

*Fig. 3-4. Replacement of drum assembly (2)*

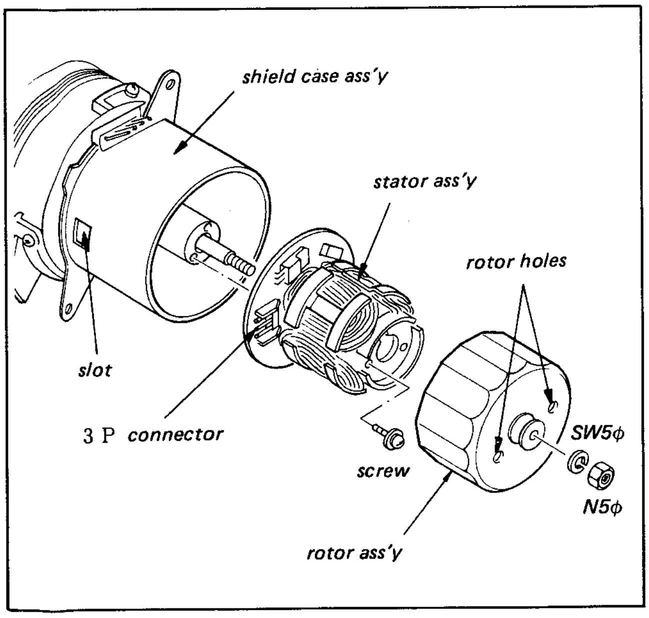

shield case ass'y
stator ass'y
rotor holes
slot
3 P connector
screw
SW5ϕ
N5ϕ
rotor ass'y

*Fig. 3-5. Replacement of drum assembly (3)*

7. Install two connectors, the drum shield assembly, and the FF belt on the drum assembly.

**Note:** 1. The bottom edge of the drum shield must be flush with the bottom edge of the shield base assembly.

2. Do not tighten the drum shield set screw too much or housing will distort.

Pull the leads of connector Ⓐ in the arrow direction and dress the leads so that the leads do not touch the EJECT belt. (See Fig. 3-6.)

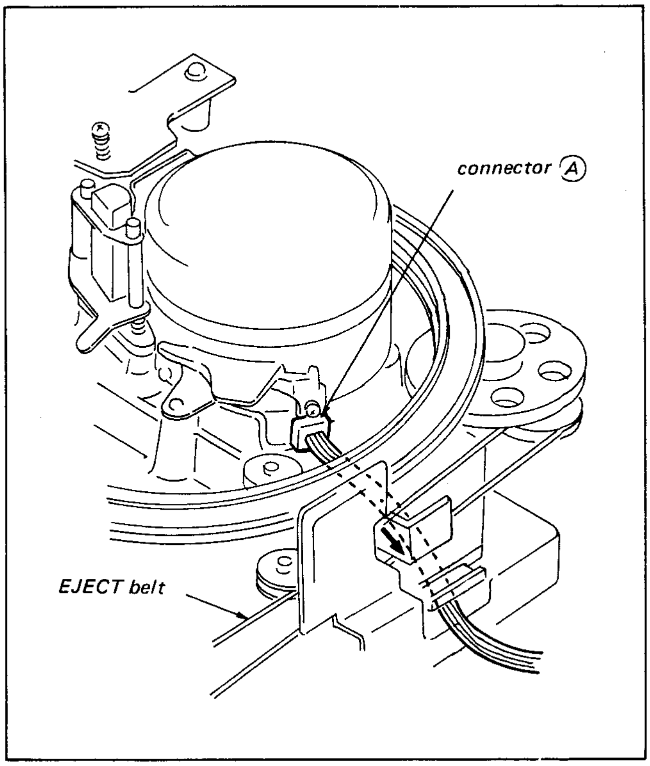

connector Ⓐ
EJECT belt

*Fig. 3-6. Replacement of drum assembly (4)*

8. Perform the following adjustments after the replacement.

| | |
|---|---|
| 3-19-1. | Tape path adjustment |
| 3-19-4. | ACE assembly position adjustment |
| 4-3-1. | Drum servo system adjustment |
| 4-4-2. | Playback amplifier frequency characteristic adjustment (RF-2 board) |
| 4-4-1. | Y-FM record current adjustment (RF-2 board) |
| 4-4-16. | Chroma record current adjustment (YC-6 board) |

## 3-3. REPLACEMENT OF CAPSTAN DC MOTOR

1. Stand the machine on its left side. Open the YC-6 and the AS-3 boards. (Refer to Section 1-1-4.)
2. Remove the DC motor from the drum base, following Steps ① to ④ shown in Fig. 3-7.
3. Take out the DC motor, following Steps ① to ⑨ shown in Fig. 3-8.

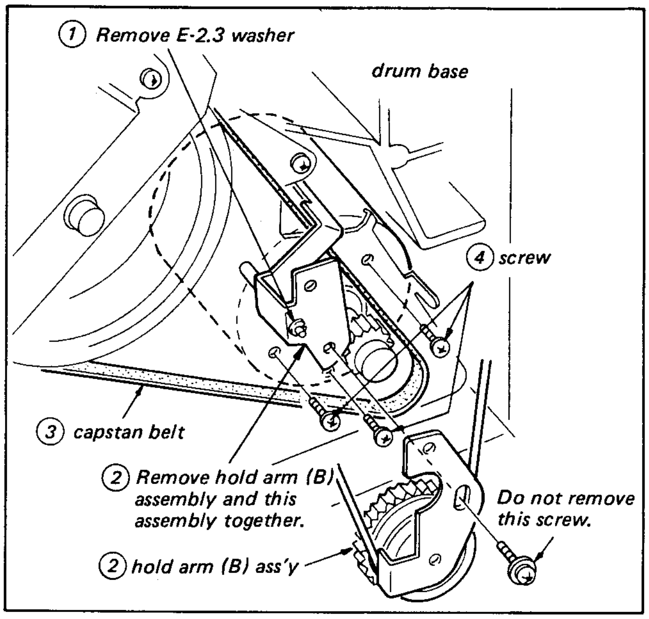

① Remove E-2.3 washer
drum base
④ screw
③ capstan belt
② Remove hold arm (B) assembly and this assembly together.
② hold arm (B) ass'y
Do not remove this screw.

Fig. 3-7. Replacement of DC motor (1)

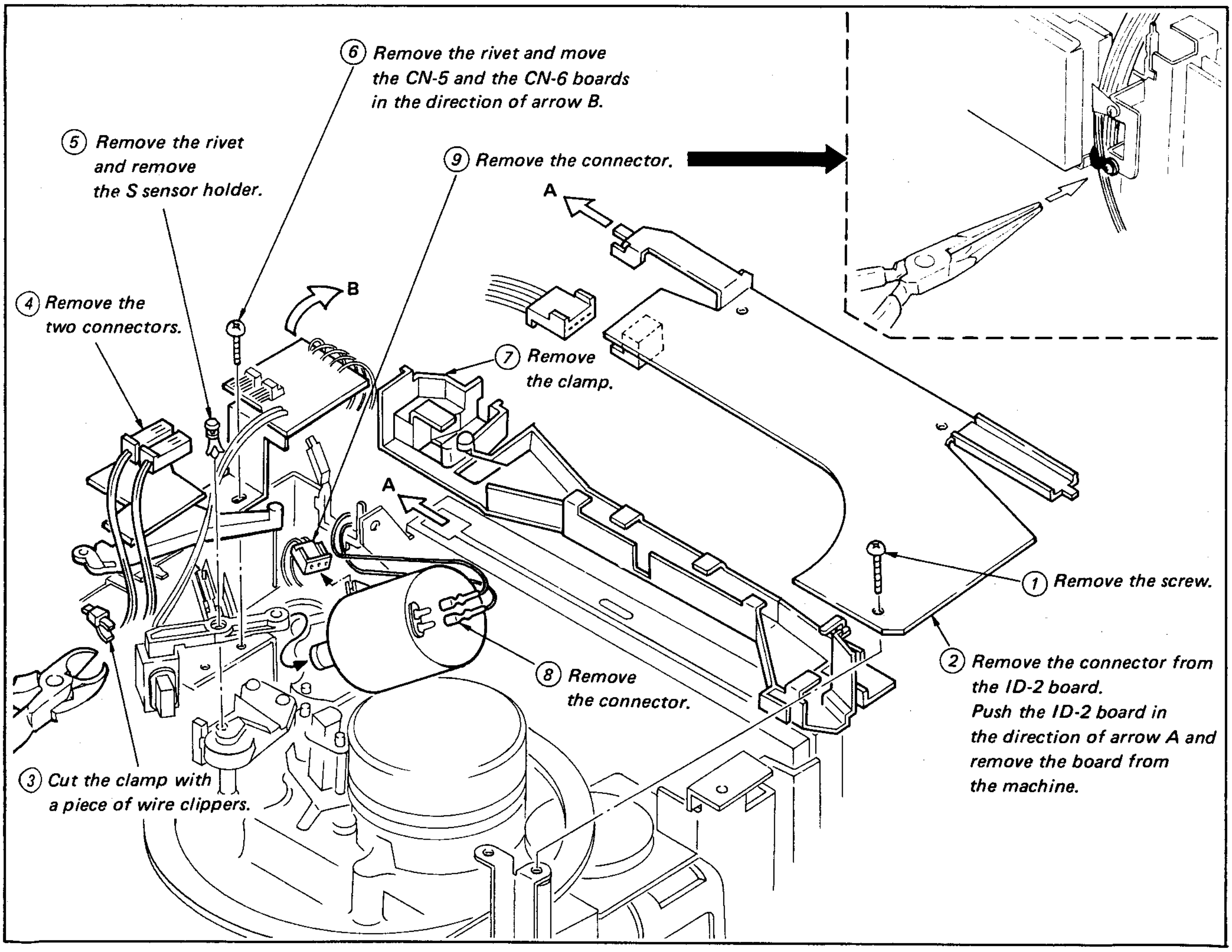

⑥ Remove the rivet and move the CN-5 and the CN-6 boards in the direction of arrow B.
⑤ Remove the rivet and remove the S sensor holder.
⑨ Remove the connector.
A
B
④ Remove the two connectors.
⑦ Remove the clamp.
A
① Remove the screw.
⑧ Remove the connector.
② Remove the connector from the ID-2 board. Push the ID-2 board in the direction of arrow A and remove the board from the machine.
③ Cut the clamp with a piece of wire clippers.

Fig. 3-8. Replacement of DC motor (2)

4. Remove capstan shield ① and motor pulley assembly ② from the defective motor and install them on the replacement motor. (See Fig. 3-9.)

**Note:** Install motor pulley assembly ② so that there is a clearance of approx. 1.5 mm between the motor pulley assembly and capstan motor ③.

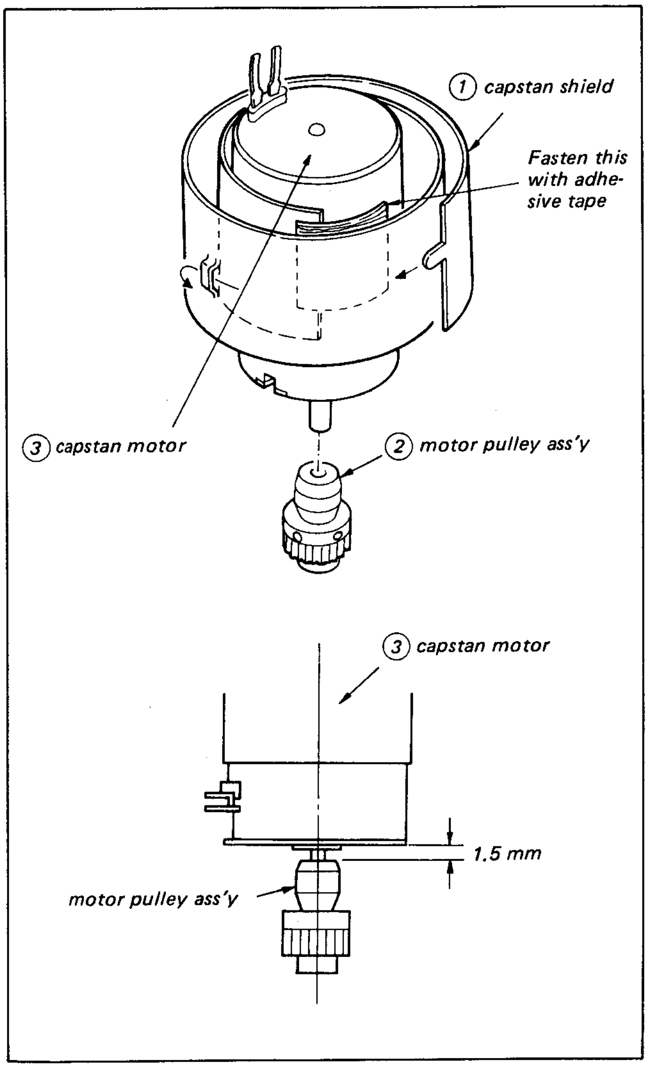

① capstan shield
Fasten this with adhesive tape
③ capstan motor
② motor pulley ass'y
③ capstan motor
1.5 mm
motor pulley ass'y

*Fig. 3-9. Replacement of DC motor (3)*

5. Perform the following adjustment after the replacement.

4-3-2.–1. Capstan free speed adjustment

## 3-4. REPLACEMENT AND ADJUSTMENT OF TENSION REGULATOR ARM PLATE ASSEMBLY AND TENSION REGULATOR BAND ASSEMBLY

The tension regulator arm replacement must be done carefully, following the procedure below, because the tape interchangeability is much affected by the tension regulator arm operation.

### 3-4-1. When Tension Regulator Band Assembly is Replaced;

1. The tension regulator band assembly can be removed after removing screw ① and hook ② shown in Fig. 3-10.
2. Perform the tension regulator FWD position adjustment described below after the replacement.
   - (i) Place the machine, without an inserted cassette, into the STOP mode. (Refer to Section 1-3.)
   - (ii) Set up the PLAY mode.
   - (iii) Move the tention regulator band assembly ③ in the arrow direction as shown in Fig. 3-10 so that the positional relationship of the brake band assembly is as shown Ⓐ in Fig. 3-10. Then tighten screw ① .
   - (iv) Perform the FWD back tension adjustment, Section 3-18, after the replacement.

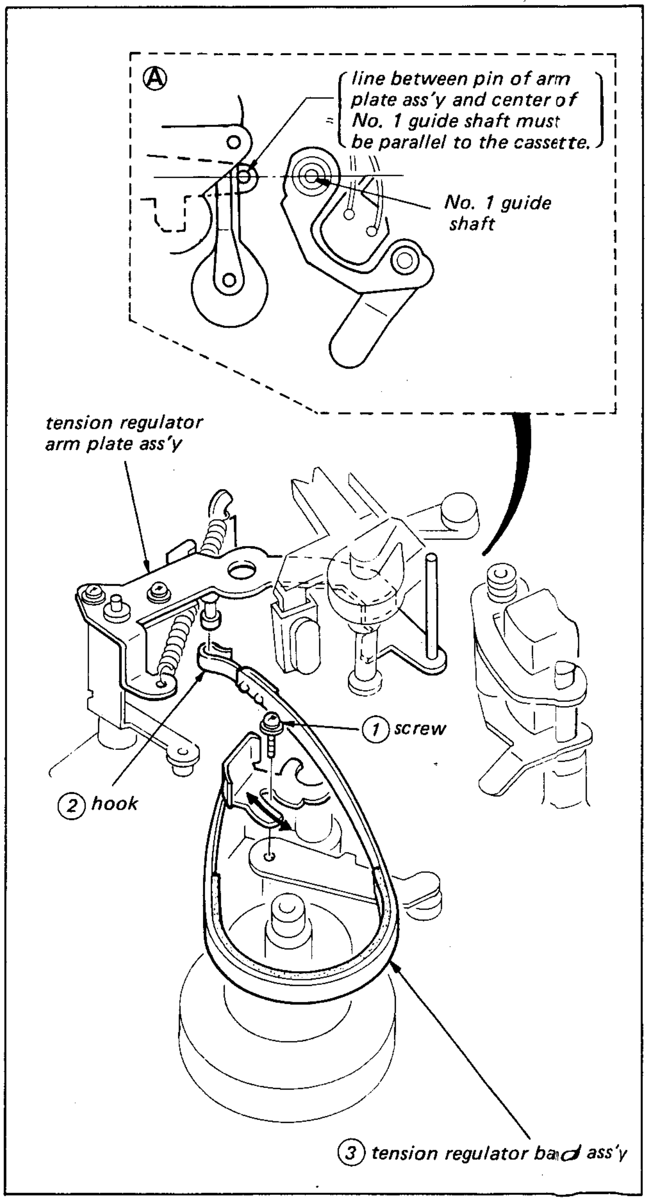

Ⓐ
line between pin of arm plate ass'y and center of No. 1 guide shaft must be parallel to the cassette.
No. 1 guide shaft
tension regulator arm plate ass'y
① screw
② hook
③ tension regulator band ass'y

*Fig. 3-10. Replacement and adjustment of the tension regulator band assembly*

### 3-4-2. When Tension Regulator Arm Plate is Replaced:

1. The tension regulator arm plate can be removed after removing two screws② and spring③ shown in Fig. 3-11.
2. After the replacement, perform the tension regulator FWD position adjustment as follows.
   - (i) Set up the STOP mode without an installed cassette. (Refer to Section 1-3.)
   - (ii) Set up the PLAY mode.
   - (iii) Loosen screw ⑤ that mounts tension regulator band assembly ④ as shown in Fig. 3-11. Move tension regulator band assembly ④ in the arrow direction, and tighten screw ⑤ tentatively when the condition shown in Ⓐ is set up.
   - (iv) Insert a standard blade-tip screwdriver into section Ⓑ, adjust the clearance between release link (1) assembly ⑥ and tension regulator arm assembly ⑦, shown in Fig. 3-11, to be 2 to 2.5 mm, and tighten screw ②.
   - (v) Repeat Steps (iii) and (iv) again and tighten screws② and⑤.
   - (vi) After the completion of the above steps, perform the FWD back tension adjustment, Section 3-18.

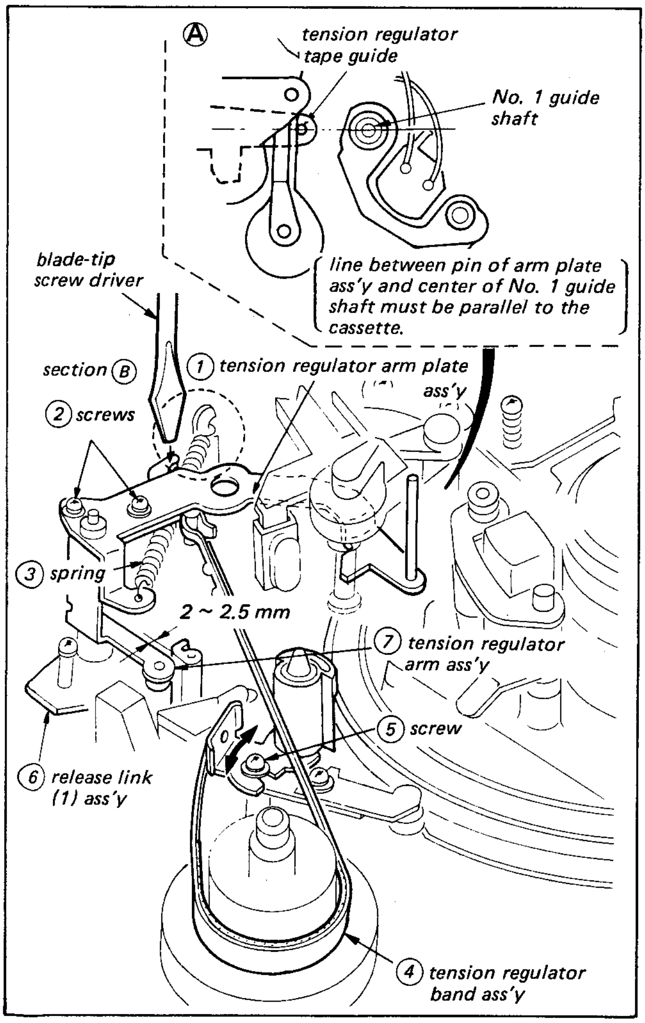

Ⓐ
tension regulator tape guide
No. 1 guide shaft
line between pin of arm plate ass'y and center of No. 1 guide shaft must be parallel to the cassette.
blade-tip screw driver
section Ⓑ
② screws
① tension regulator arm plate ass'y
③ spring
2 ~ 2.5 mm
⑦ tension regulator arm ass'y
⑤ screw
⑥ release link (1) ass'y
④ tension regulator band ass'y

*Fig. 3-11. Replacement and adjustment (1) of tension regulator arm plate assembly*

3. Play back the 1 MHz segment of the alignment tape (KR5-1H). Loosen the lock screw and adjust screw "A" in Fig. 3-12 so that the RF waveform becomes that (see the waveform in the tape path adjustment, Section 3-19-1.) when the TRACKING knob is turned to the right and left from its center detent position and so that the tape is not apart from the flanges of guides ①, ② and ③ shown in Fig. 3-12 and there is not a large tape curl at the guides.

**Note:** Do not turn screw "A" to the right and left more than 90 degrees from its initial position.

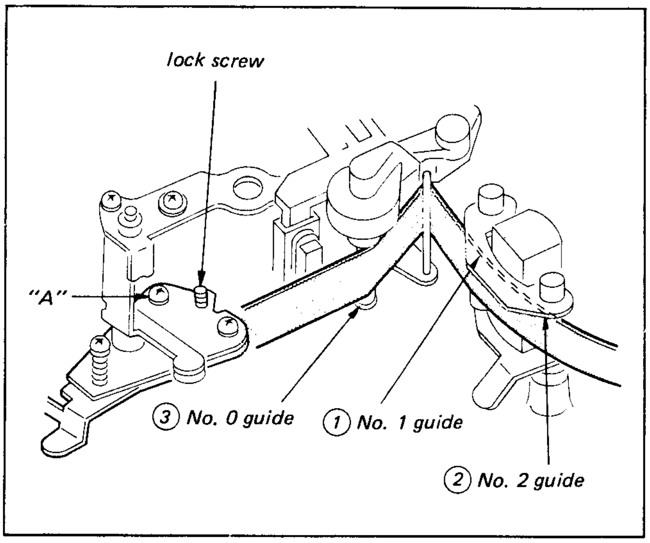

lock screw
"A"
③ No. 0 guide
① No. 1 guide
② No. 2 guide

*Fig. 3-12. Replacement and adjustment (2) of tension regulator arm plate assembly*

4. Confirm that there is not a large bending of the tape at each of the tension regulator guide pin section and the No. 0 guide section shown in Fig. 3-13 after the completion of the adjustment. If the bending is found, repeat Step 3.

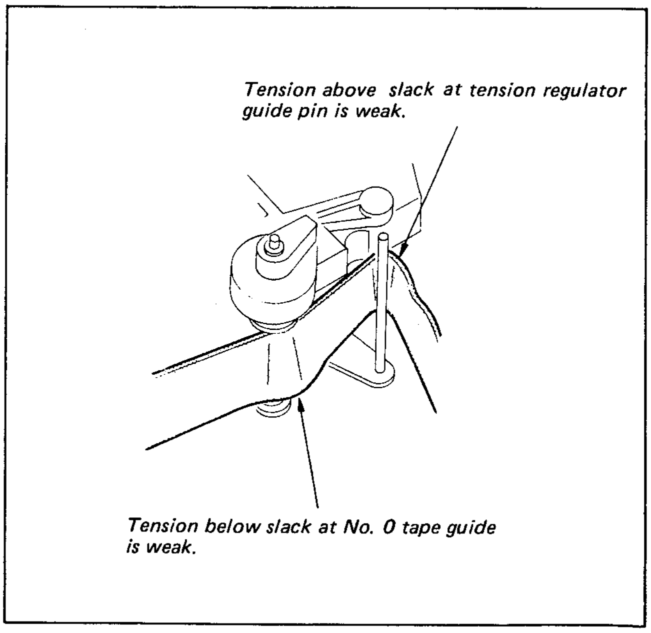

Tension above slack at tension regulator guide pin is weak.
Tension below slack at No. 0 tape guide is weak.

*Fig. 3-13. Replacement and adjustment (3) of tension regulator arm plate assembly*

## 3-5. REPLACEMENT OF CASSETTE-LIFT ASSEMBLY

1. Set up the unthreading state and remove the cassette-lift assembly by loosening four screws.
2. Install the cassette-lift assembly so that the reel tables and the reel holes on the cassette holder from concentric circles. (See Fig. 3-14.)
3. Insert the cassette into the cassette-lift compartment after the installation, set up the EJECT mode to perform unthreading after setting up the STOP mode, and confirm that the cassette-lift compartment assembly lifts. Make the confirmation after performing the lid opener position adjustment in Section 3-10.

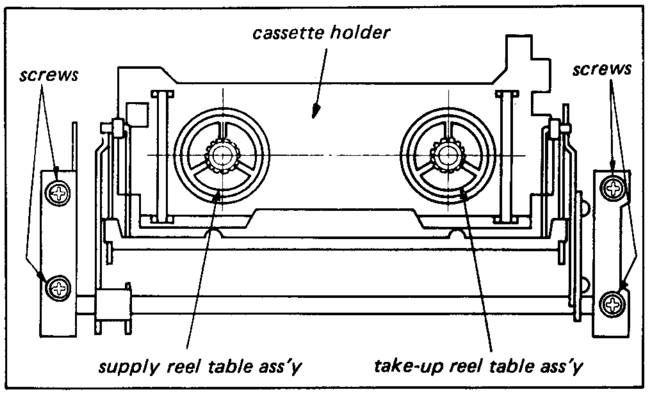

cassette holder
screws
screws
supply reel table ass'y
take-up reel table ass'y

*Fig. 3-14. Replacement of cassette-lift assembly*

## 3-6. ADJUSTMENT OF REEL TABLE HEIGHT

- Since the reel table height serves as the reference of the tape movement system, the height must be adjusted caerfully after the reel table replacement.

1. Measure the height of the reel table with a slide caliper prior to the removal of the old reel table. (See Fig. 3-15.)
2. Place a new reel table, measure its height, and adjust height by adding or removing the adjusting spacer so that the difference in the heights of the former and new reel tables is within 0.1mm. (See Fig. 3-15.)

## 3-7. POSITION ADJUSTMENT, PAUSE SOLENOID

1. Set up the STOP mode without the cassette installed. (Refer to Section 1-3.)
2. Set up the REC PAUSE state so as to place the solenoid into the energized state.
3. Loosen the screws ① that mount the solenoid and move the solenoid in the direction indicated by screw Ⓐ as shown in Fig. 3-16 so that a clearance is made between the brake rubber and the take-up reel table.
4. Then move the solenoid in the direction shown by arrow Ⓑ and tighten screws ① after the solenoid is moved further 0.8 mm in the Ⓑ arrow direction from the point where the brake rubber begins to touch the take-up reel table assembly.

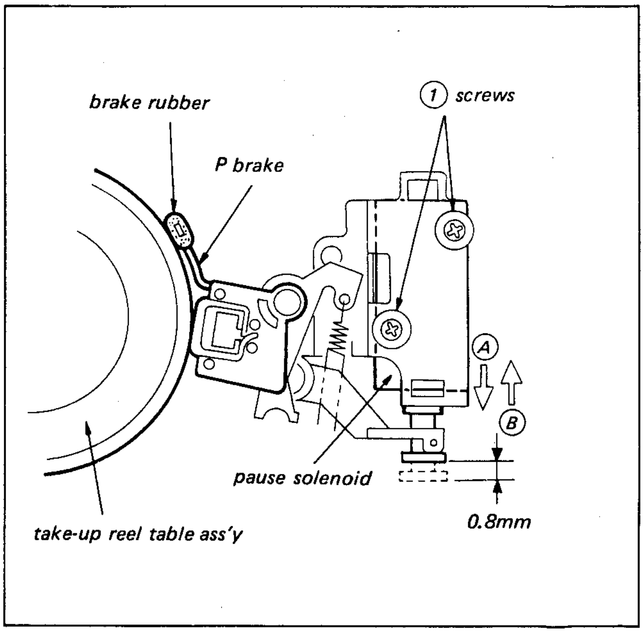

brake rubber
① screws
P brake
Ⓐ
Ⓑ
pause solenoid
0.8mm
take-up reel table ass'y

*Fig. 3-16. Position adjustment of pause solenoid (Stroke adjustment)*

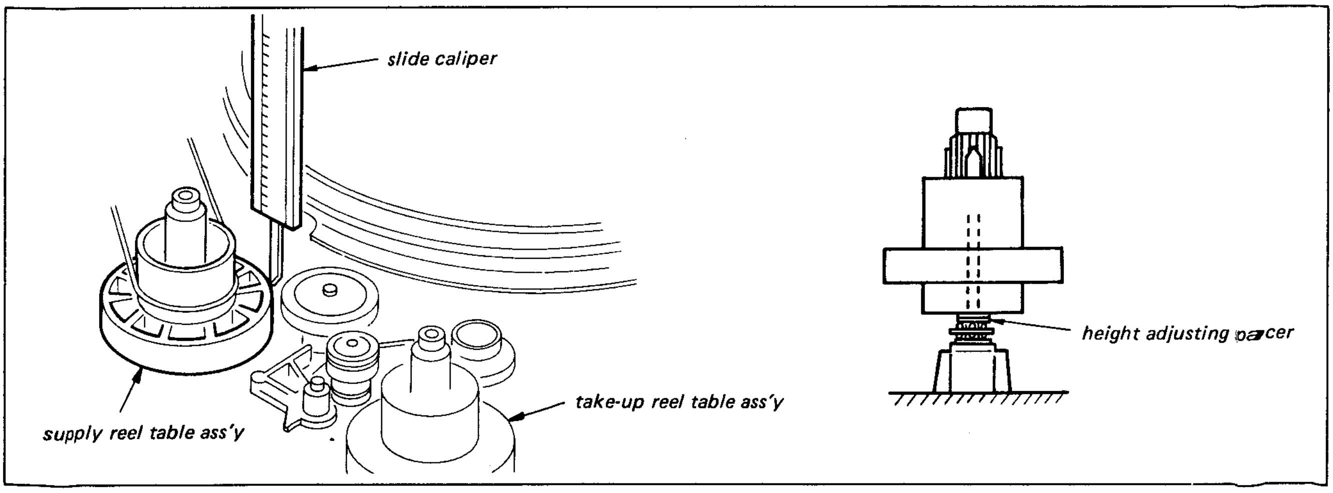

slide caliper
height adjusting spacer
take-up reel table ass'y
supply reel table ass'y

*Fig. 3-15. Adjustment of reel table height*

## 3-8. POSITION ADJUSTMENT OF FUNCTION SOLENOID

### 3-8-1. Position Adjustment of PLAY, F. FWD and REW Solenoids

The four solenoids shown in Fig. 3-17 require careful adjustments because these solenoids are the driving force for the PLAY, F. FWD, and other tape operations. (As to the position adjustment of the EJECT solenoid, refer to Section 3-8-2.)

1. Set up the STOP mode without the cassette. (See Section 1-3.)
2. Remove the two screws fixing the SY-10 board and open the board in the direction of the arrow.

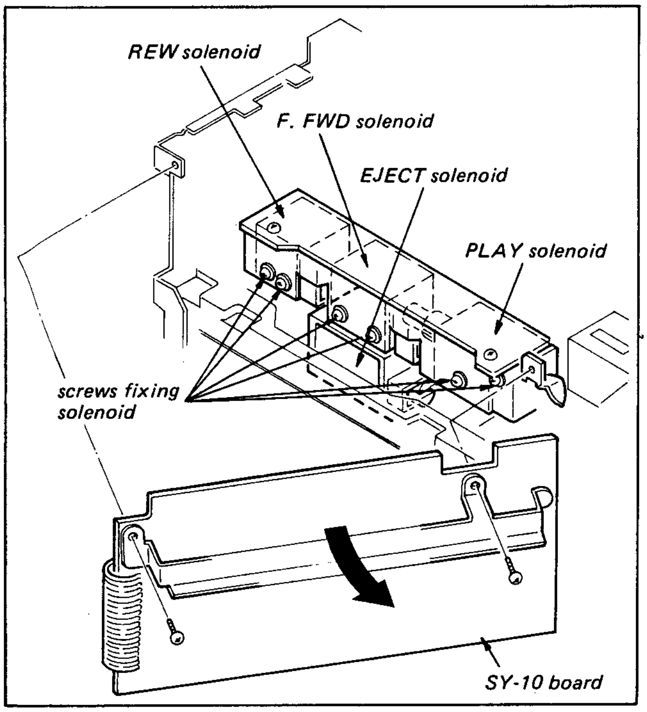
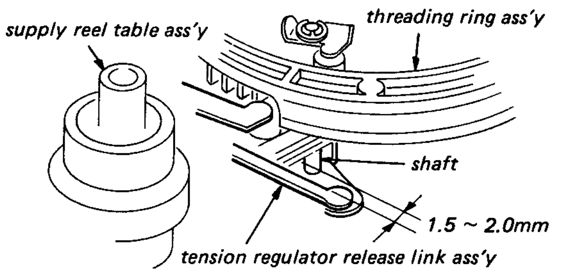

REW solenoid
F. FWD solenoid
EJECT solenoid
PLAY solenoid
screws fixing solenoid
SY-10 board

*Fig. 3-17. Position adjustment of function solenoid*

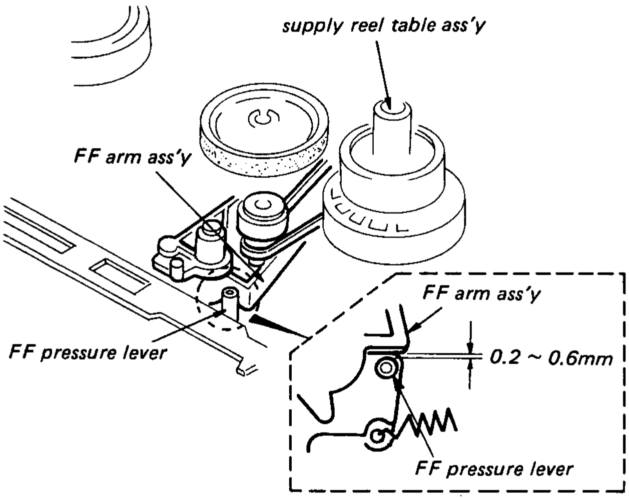
3. Check that the solenoids make the following operations when the relative mode to a solenoid is set up.
   - PLAY solenoid ....... Placing the tension regulator assembly into the operation.
     Making the FWD limiter assembly press the take-up reel table.
     Releasing the S and T brakes.
     Releasing the soft brakes.
   - F. FWD solenoid ..... Making the intermediate pulley assembly press the take-up reel table.
     Releasing the S and T brakes.
   - REW solenoid ....... Making the REW idler assembly press the supply reel table.
     Releasing the S and T brakes.
4. Check that the solenoids satisfy the specifications in Fig. 3-18. If the specifications are not satisfied, loosen the screws fixing the solenoid and adjust the position of the solenoid. See Fig. 3-17.
5. After tightening the screws, repeat Steps 3 and 4.

**(1) stroke of PLAY solenoid**


supply reel table ass'y
threading ring ass'y
shaft
1.5 ~ 2.0mm
tension regulator release link ass'y

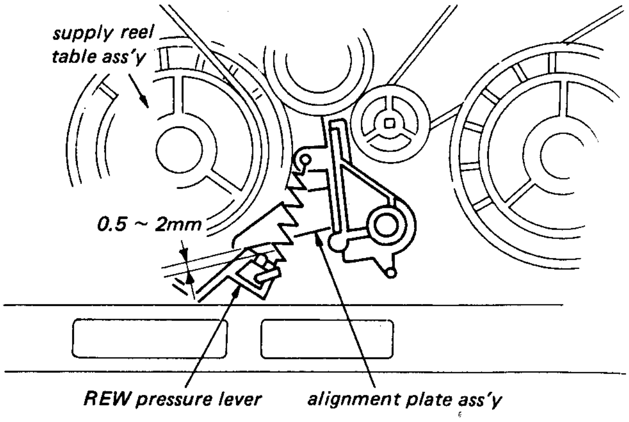
**Specification:** *A clearance of 1.5 to 2.0mm must be between the tension regulator release link ass'y and the shaft in the PLAY mode.*

**(2) stroke of F. FWD solenoid**


supply reel table ass'y
FF arm ass'y
FF pressure lever
FF arm ass'y
0.2 ~ 0.6mm
FF pressure lever

**Specification:** *A clearance of 0.2 to 0.6mm must be between the FF arm ass'y and the FF pressure lever in the F. FWD mode.*

**(3) stroke of REW solenoid**

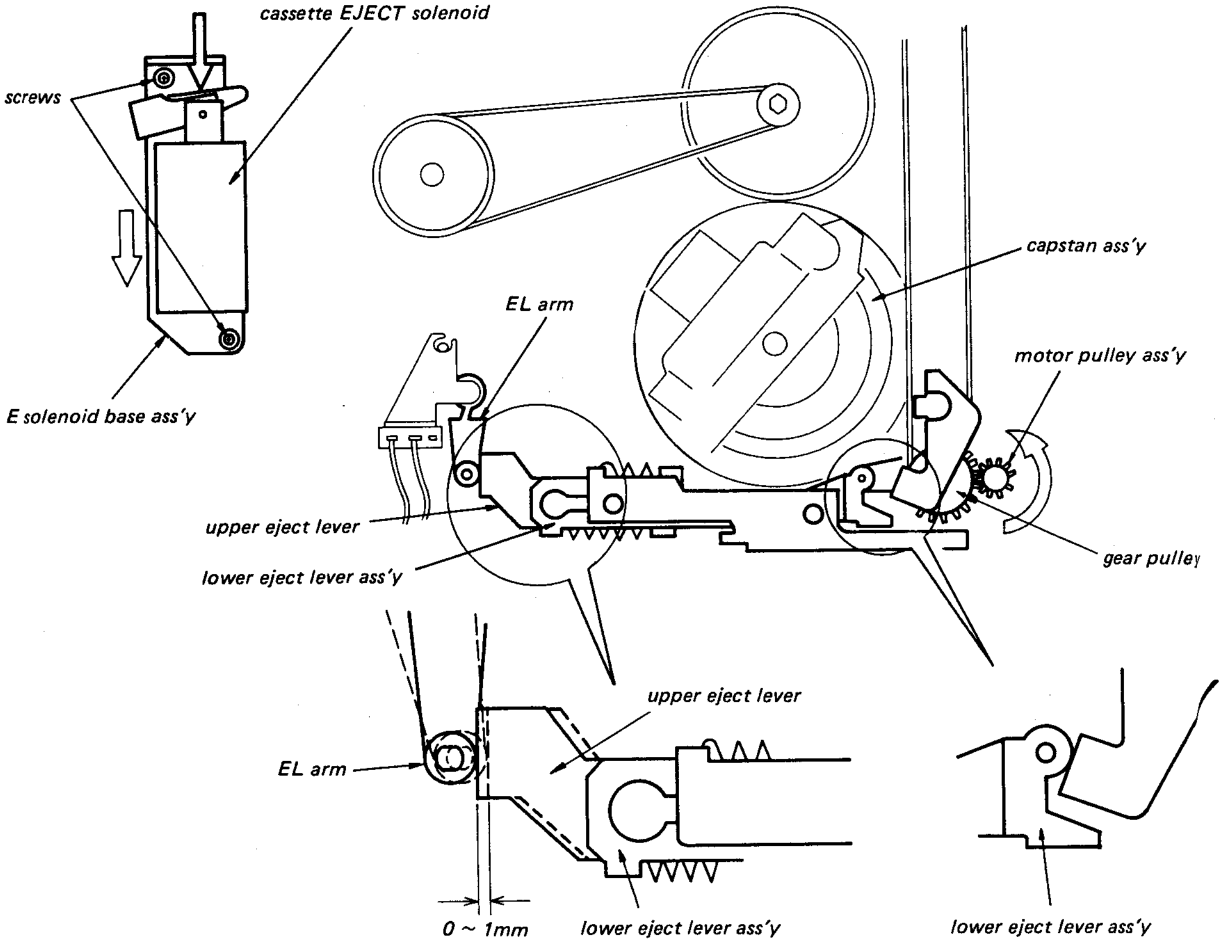

supply reel table ass'y
0.5 ~ 2mm
REW pressure lever
alignment plate ass'y

**Specification:** *A clearance of 0.5 to 2mm must be between the REW pressure lever and the alignment plate ass'y in the REW mode.*

*Fig. 3-18. Specifications of PLAY, F. FWD, and REW solenoid strokes*

### 3-8-2. Position Adjustment of EJECT Solenoid

1. Set up the STOP mode without the cassette. (See Section 1-3.)
2. Check that following operations take place when the EJECT mode is set up.
   - EJECT solenoid .... The E idler assembly presses the take-up reel table.
     The ring arm assembly is released.
     The cassette compartment lock is released.
     The gear pulley engages with the motor pulley assembly.
3. Stand the machine on its left side down. Open the YC-6 and the AS-3 boards. (Refer to Section 1-1-4.)
4. Check that the specification shown in Fig. 3-19 is satisfied. If it is not, perform Steps 5, 6, and 7.
5. Push the cassette detect lever and release the lever at a midway of the threading.
6. Loosen the two screws shown in Fig. 3-19. Move the E solenoid base assembly to the position where the specification shown in Fig. 3-19 is satisfied, while turning the motor pulley assembly counterclockwise and setting the solenoid to the energized state.
7. After tightening the screws, repeat Steps 2 and 4.


cassette EJECT solenoid
screws
E solenoid base ass'y
capstan ass'y
EL arm
motor pulley ass'y
upper eject lever
lower eject lever ass'y
gear pulley
upper eject lever
EL arm
0 ~ 1mm
lower eject lever ass'y
lower eject lever ass'y

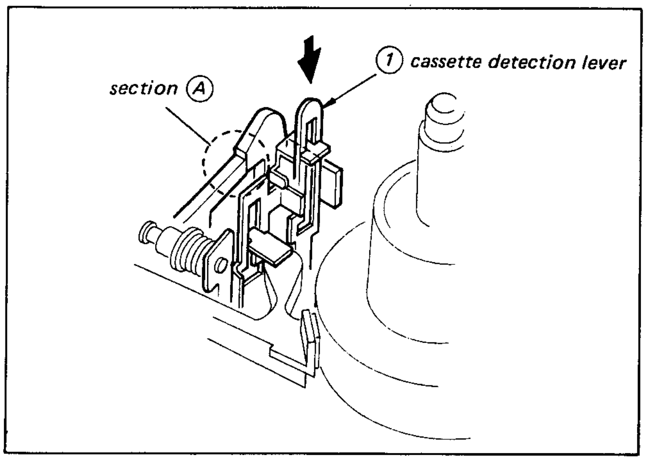
**Specification:** *The upper eject lever must ride 0 to 1mm over the lower eject lever ass'y in the EJECT mode.*

*Fig. 3-19. Position adjustment of EJECT solenoid*

## 3-9. ADJUSTMENT OF THREADING AND UNTHREADING

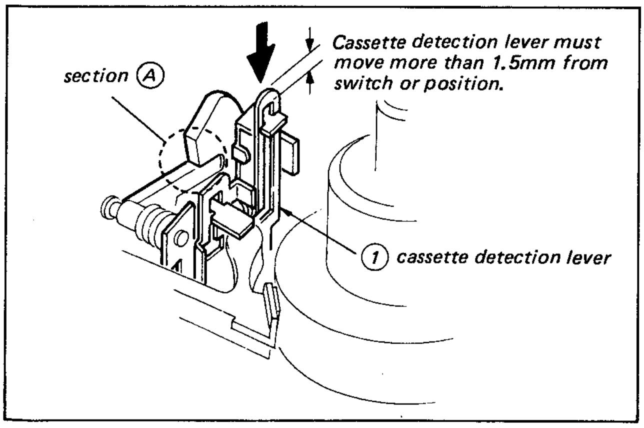
### 3-9-1. Operation Check of Cassette-in Switch

1. Set up the unthreading completion state without an inserted cassette and turn off the power.
2. Set section Ⓐ as shown in Fig. 3-20.
3. Confirm that the microswitch mounted on the underside of the machine does not turn on when the cassette detection lever ① is pushed in the arrow direction.
4. Set section Ⓐ as shown in Fig. 3-21.
5. Confirm with a click that the microswitch mounted on the underside of the machine turns on when the cassette detection lever ① is pushed in the arrow direction.
6. Adjust the mounting position of cassette detection① so that it moves more than 1.5mm further from the point where the click is heard.



① cassette detection lever
section Ⓐ

*Fig. 3-20. Operation check of cassette-in switch*



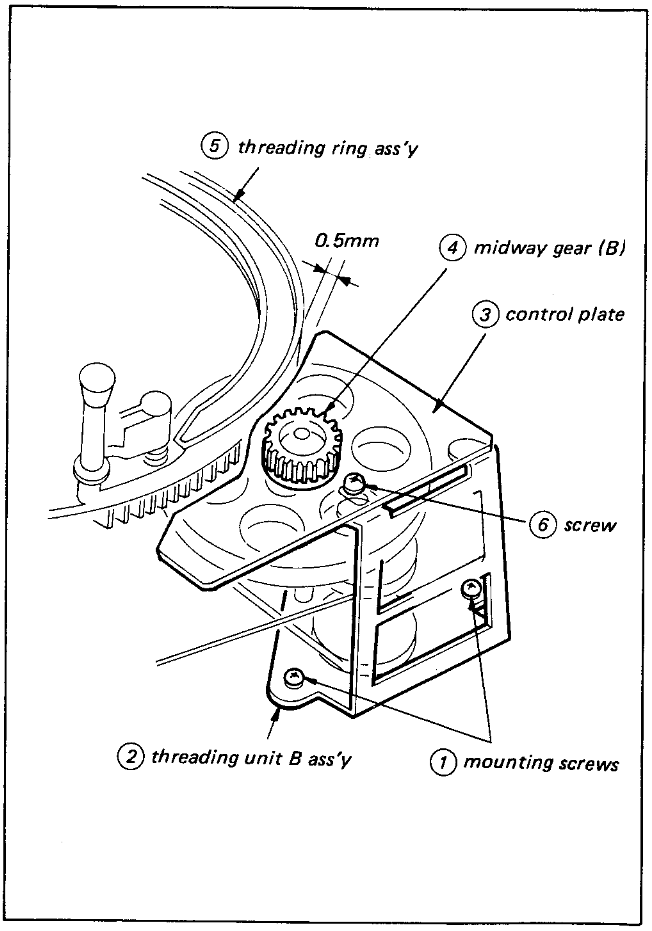
Cassette detection lever must move more than 1.5mm from switch or position.
section Ⓐ
① cassette detection lever

*Fig. 3-21. Operation check of cassette-in switch*

**Note:**
- The problem where the cassette-lift assembly does not lock occurs if the microswitch turns on in the condition shown in Fig. 3-20.
- The problem where the modes other than the EJECT mode cannot be set up occurs if the microswitch does not turn on in the state shown in Fig. 3-21.

### 3-9-2. Position Adjustment of Threading Unit B Assembly and Control Plate

1. Push down the cassette detection lever with fingers to perform the threading operation and release the lever when the threading ring assembly ⑤ shown in Fig. 3-22 has turned 90 degrees.
2. Loosen screws ① shown in Fig. 3-22. Make the clearance (0.2mm) between midway gear (B) ④ and threading ring assembly⑤ and tighten screws①.
3. Make a clearance of 0.5mm between control plate ③ and threading ring assembly⑤ and tighten screw⑥.



⑤ threading ring ass'y
0.5mm
④ midway gear (B)
③ control plate
⑥ screw
② threading unit B ass'y
① mounting screws

*Fig. 3-22. Position adjustment of threading unit B assembly and control plate*

### 3-9-3. Position Adjustment of Gear Pulley Hold Arm Assembly

1. Loosen screw ① shown in Fig. 3-23, adjust the position of the gear pulley hold arm assembly so that the clearance between the motor pulley assembly ② and the gear pulley ③ is 0.3 mm, and tighten screw ① .

### 3-9-4. Adhesion of Brake Shoe

1. Glue the brake shoe to the groove on the brake arm as shown in Fig. 3-23.

**Note:** If the brake shoe is not glued in the right position, it is possible for the brake shoe to touch the capstan belt. If the shoe is removed, there is a possibility of the occurrence of an abnormal sound at the initial stage of the unthreading.

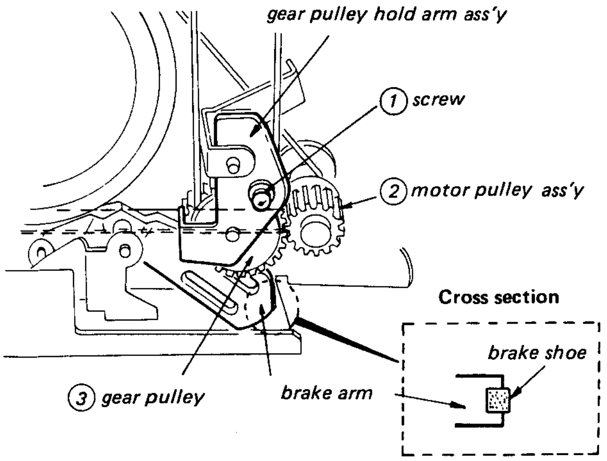

gear pulley hold arm ass'y
① screw
② motor pulley ass'y
Cross section
brake shoe
③ gear pulley
brake arm

*Fig. 3-23. Position adjustment of gear pulley hold arm assembly*

### 3-9-5. Clearance Adjustment of Cassette Lift Assembly Arm

- Since a poor adjustment of the clearance causes the condition that the cassette lift assembly arm ② is in strong contact with the threading ring assembly ③ , the threading and unthreading cannot always be performed smoothly. When the clearance is larger than the specified value, the lock of the cassette lift assembly comes loose and the cassette lift assembly lifts during the unthreading, damaging the tape.

1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
2. Loosen screw ① and adjust the position of the cassette lift assembly arm ② with the thickness gauge so that the clearance between the cassette lift assembly arm ② and the threading ring ③ satisfies the specification (0.2 mm to 0.5 mm). (See Fig. 3-24.)
3. Check the value again after the screw is tightened.

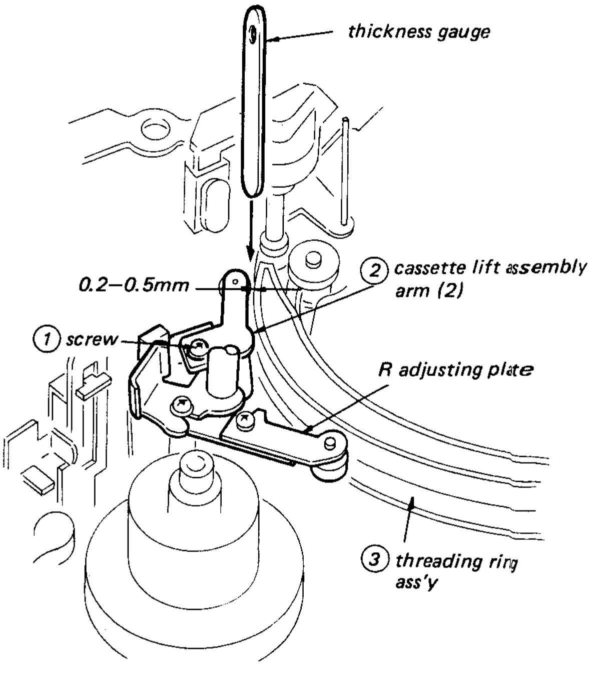

thickness gauge
0.2–0.5mm
② cassette lift assembly arm (2)
① screw
R adjusting plate
③ threading ring ass'y

*Fig. 3-24. Clearance adjustment of cassette lift assembly arm*

### 3-9-6. Clearance Adjustment of Ring Arm

- The ring arm serves to stabilize the position of the threading ring at the completion of threading. If this adjustment is wrong, there is a possibility that the threading ring may move, from the position reached at the threading completion point, during the PLAY, FAST FWD and RECORD modes.

1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
2. Set up the PLAY mode.
3. Loosen screw ① shown in Fig. 3-25 and adjust R adjusting plate assembly ② so that the clearance between the roller of R adjusting plate assembly ② and threading ring assembly ③ satisfies the specification (0 to 0.2 mm). Repeat the threading and unthreading operations several times, confirm that the roller of R adjusting plate assembly ② drops into the bottom of the cam of the threading ring, and tighten screw ① after the confirmation.

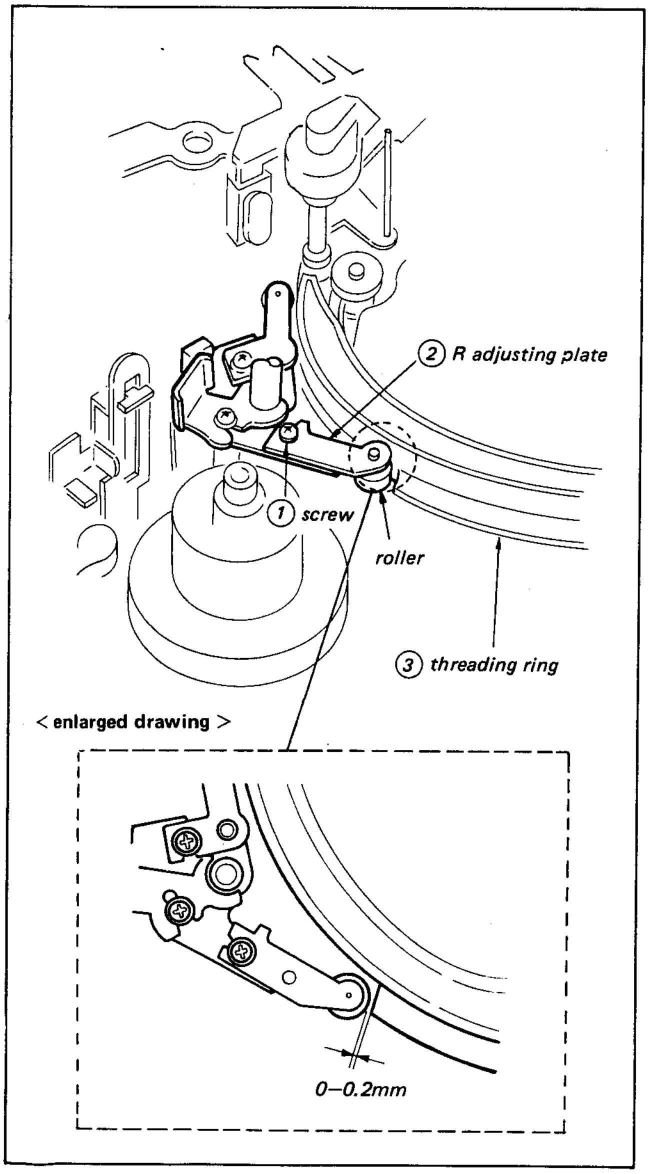

② R adjusting plate
① screw
roller
③ threading ring
< enlarged drawing >
0–0.2mm

*Fig. 3-25. Clearance adjustment of ring arm*

### 3-9-7. Check of Unthreading Completion

1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
2. Set up the EJECT mode to complete the unthreading.
3. Confirm that the roller of cassette lift assembly arm (2) shown in Fig. 3-26 moves in the arrow direction when the cassette lift assembly arm (2) is pushed in the arrow direction.
4. Confirm that the tension regulator arm assembly is in contact with the boss of the cassette position-determining post. (See Fig. 3-26.)

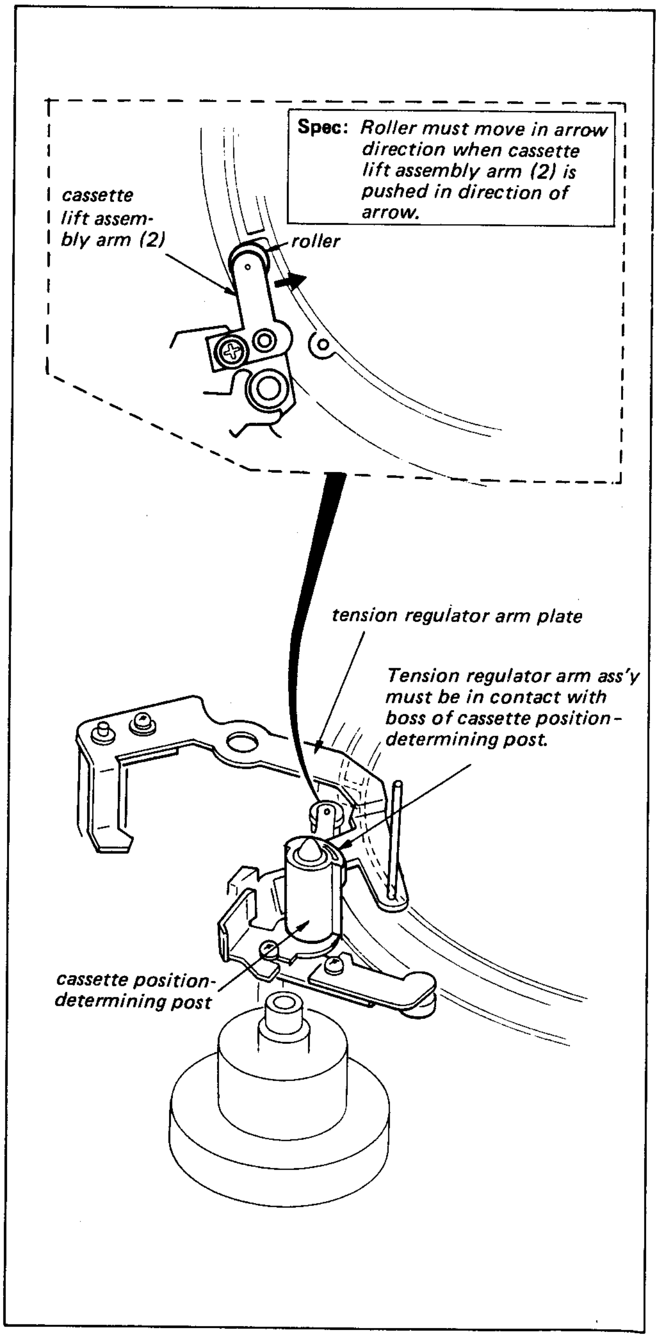

Spec: Roller must move in arrow direction when cassette lift assembly arm (2) is pushed in direction of arrow.
cassette lift assembly arm (2)
roller
tension regulator arm plate
Tension regulator arm ass'y must be in contact with boss of cassette position-determining post.
cassette position-determining post

*Fig. 3-26. Check of unthreading completion*

## 3-10. POSITION ADJUSTMENT OF LID OPENER

- The mounting position of the cassette lid opener bracket is different when the cassette lift assembly is attached and is not attached to the SL-C7E.

1. When the cassette lift assembly is attached;

   (i) The plate of the cassette lid opener bracket must be near the center of the slot in the white plastic holder guide when the cassette lift assembly is lowered. If it is not in this position, bend the lower section of the cassette lid opener bracket, as shown in Fig. 3-27. for adjustment.

   (ii) Confirm that section Ⓐ in Fig. 3-27 satisfies the specification (0.5mm to 3mm) when the cassette is inserted and the PLAY mode is set up. This is the spacing between the tape and the take-up sensor.

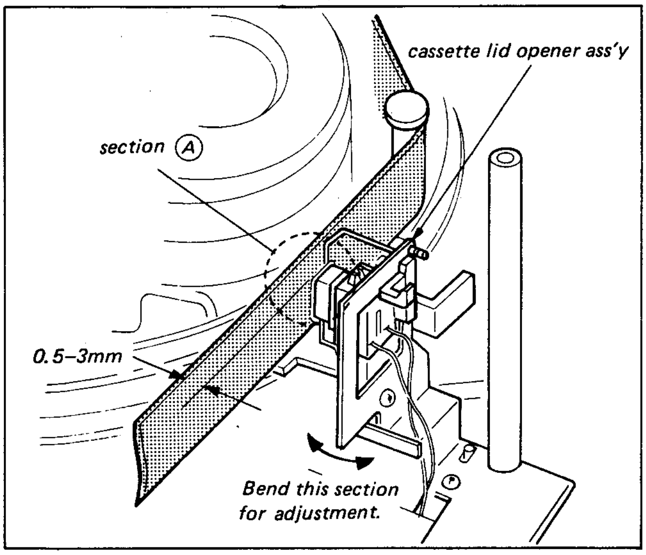


*Fig. 3-27. Position adjustment of cassette lid opener metal (1)*

2. When the cassette lift assembly is not attached;

   (i) Bend the lower section of the cassette lid opener bracket so that the cassette lid opener bracket positions itself almost at the center of the space marked by asterisk (*) shown in Fig. 3-28, when the cassette is placed on the four position determining posts.

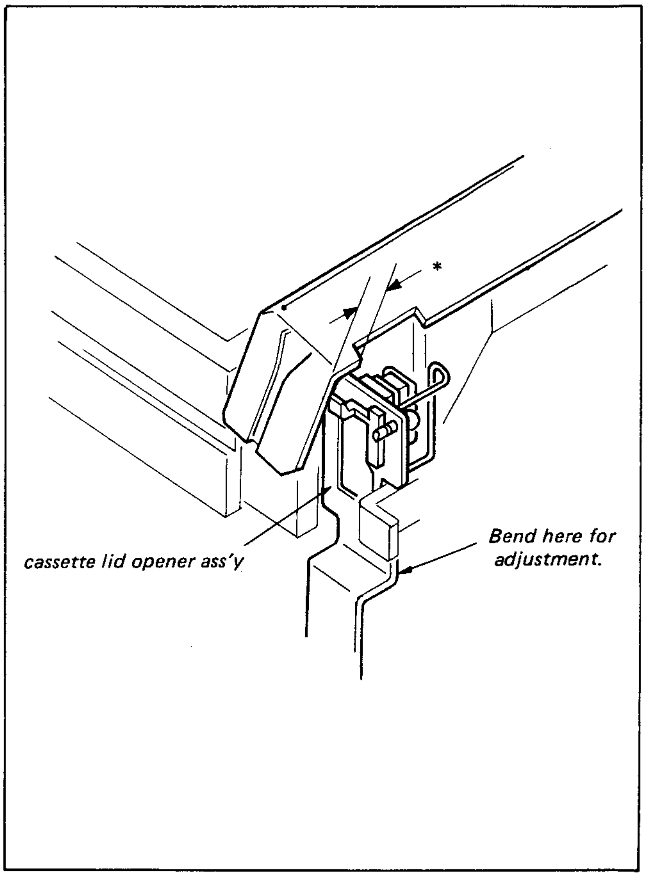


*Fig. 3-28. Position adjustment of cassette lid opener metal (2)*

## 3-11. REPLACEMENT AND ADJUSTMENT OF THREADING RING ASSEMBLY

1. Turn the threading ring to a point immediately before the threading completion position and stop it at the point where it does not touch the lock hold arm. (See Fig. 3-29.)
2. Perform procedures ① to ⑤ shown in Fig. 3-29.
3. Remove the threading ring while moving the tension regulator arm assembly in the arrow direction by holding its lower section.

   **Note:** Do not hold the upper section of the tension regulator arm while moving the assembly.

4. Perform the adjustment of control plate ①, R adjusting plate ③, No. 0 guide section assembly ④, and ring roller unit assembly ⑤ after the replacement.

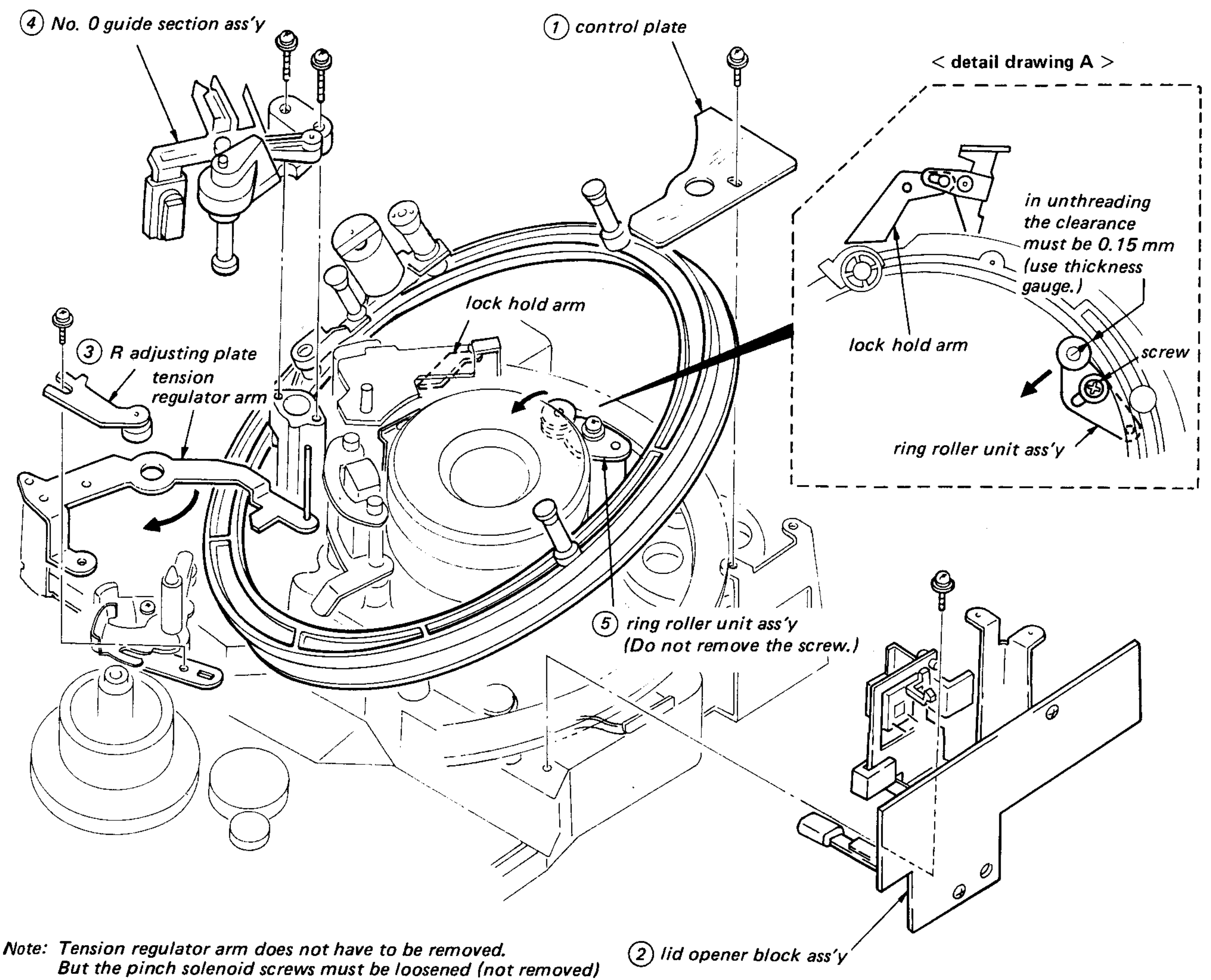
   (i) As to the adjustment of control plate ①, refer to "Position Adjustment of Threading Unit B assembly and Control Plate", Section 3-9-2.

   (ii) As to the adjustment of R adjusting plate ③, refer to "Clearance Adjustment of Ring Arm", Section 3-9-6.

   (iii) As to the adjustment of No. 0 guide section assembly ④, perform procedure 6 of this section.

   (iv) As to the adjustment of ring roller unit assembly ⑤, perform the adjustment, referring to detail drawing A in Fig. 3-29.

5. Perform the threading and unthreading several times and confirm the smooth movement of the threading ring.


④ No. 0 guide section ass'y
① control plate
< detail drawing A >
in unthreading the clearance must be 0.15 mm (use thickness gauge.)
lock hold arm
screw
ring roller unit ass'y
lock hold arm
③ R adjusting plate
tension regulator arm
⑤ ring roller unit ass'y (Do not remove the screw.)
② lid opener block ass'y

*Note: Tension regulator arm does not have to be removed. But the pinch solenoid screws must be loosened (not removed) and the solenoid slipped out of the way to finally remove the threading ring.*

*Fig. 3-29. Replacement of threading ring block assembly*

6. Adjustment after the mounting of No.0 guide section assembly
   - (i) Playback the 1MHz segment of the alignment tape (KR5-1H).
   - (ii) Turn the TRACKING control knob so that the RF waveform at TP2005 on RF-2 board is 2/3 of its maximum level. (See Fig. 3-30.)
   - (iii) Turn the No.0 guide shown in Fig. 3-30 fully counterclockwise (↶), then clockwise until the point where the RF waveform at the exit section becomes flat with small fluctuation, and tighten the mounting screws.

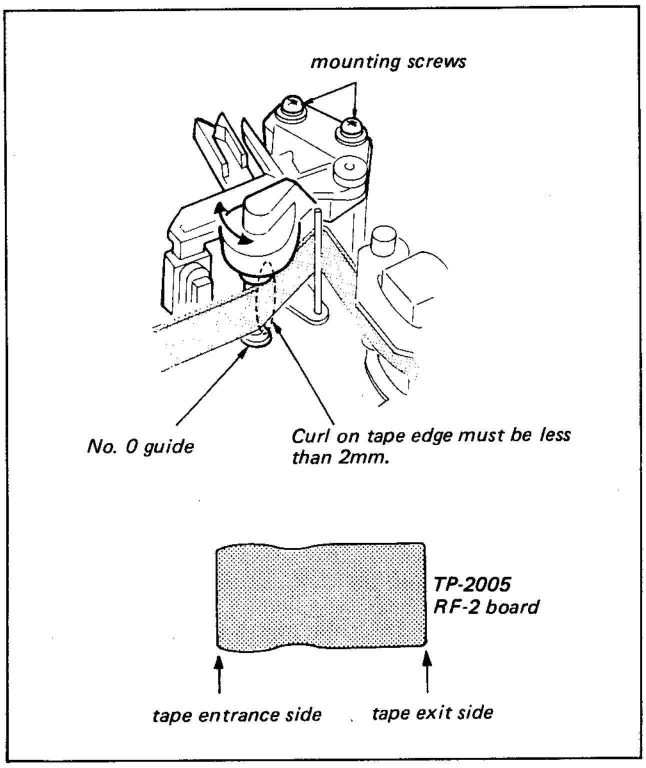

mounting screws
No. 0 guide
Curl on tape edge must be less than 2mm.
TP-2005
RF-2 board
tape entrance side
tape exit side

*Fig. 3-30. Position adjustment of No.0 guide section assembly mounting*

## 3-12. POSITION ADJUSTMENT OF PINCH ROLLER SOLENOID

### 3-12-1. Parallelism Adjustment of Pinch Press Lever

1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
2. Perform Steps ① to③ shown in Fig. 3-31 so as to set up the state in which the screw of pinch press lever shaft adjusting plate④ can be loosened.
3. Loosen the two screws ① fastening the pinch solenoid base ③ shown in Fig. 3-32 and tighten screws ① when the pinch solenoid base ③ becomes parallel to the drum base.
4. Loosen two screws② shown in Fig. 3-32 by 1/3 to 1/2 turn and move pinch press lever shaft adjusting plate ④ in the direction shown by arrow B.
5. Insert a standard blade-tip screwdriver into hole F when the iron core is pulled slightly and pinch roller arm assembly ⑤ touches capstan shaft ⑥ equally along the complete length of the pinch roller. The pinch roller and the capstan should be parallel. Move the pinch press lever shaft adjusting plate ④ in the direction shown by arrow C and tighten the two screws ② when clearance A becomes 0.

**Note:** If the pinch roller arm assembly ⑤ does not touch the capstan with parallel and equally force when the iron core is pulled slightly, move pinch solenoid base ③ with a standard blade-tip screwdriver in the direction shown by arrow D.

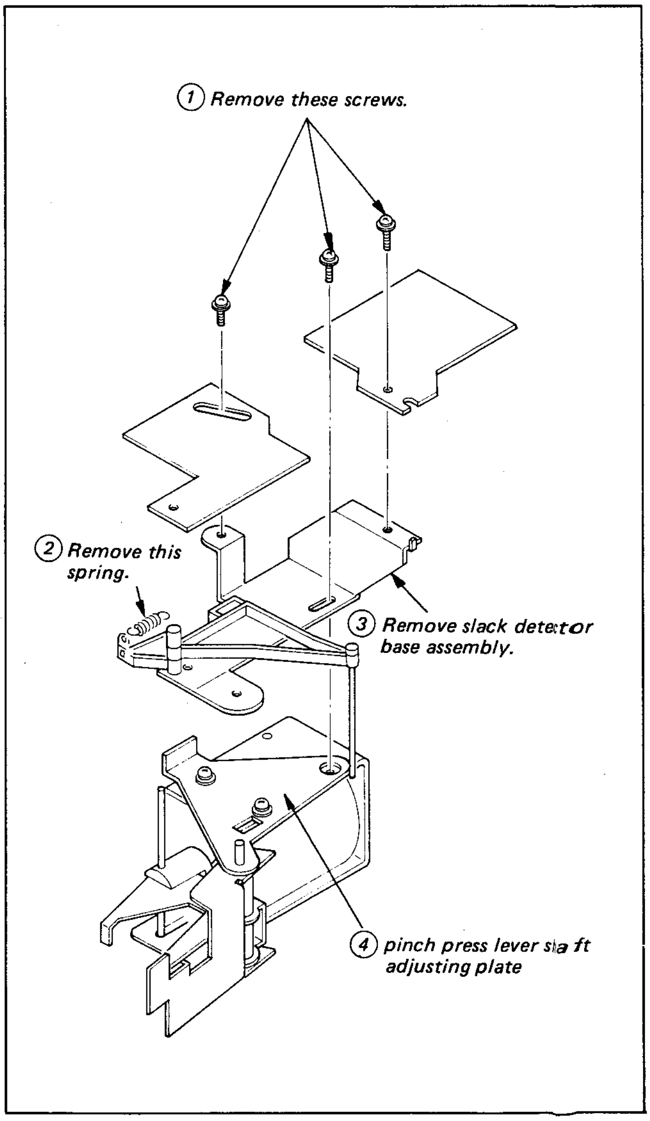

① Remove these screws.
② Remove this spring.
③ Remove slack detector base assembly.
④ pinch press lever shaft adjusting plate

*Fig. 3-31. Disassembly*

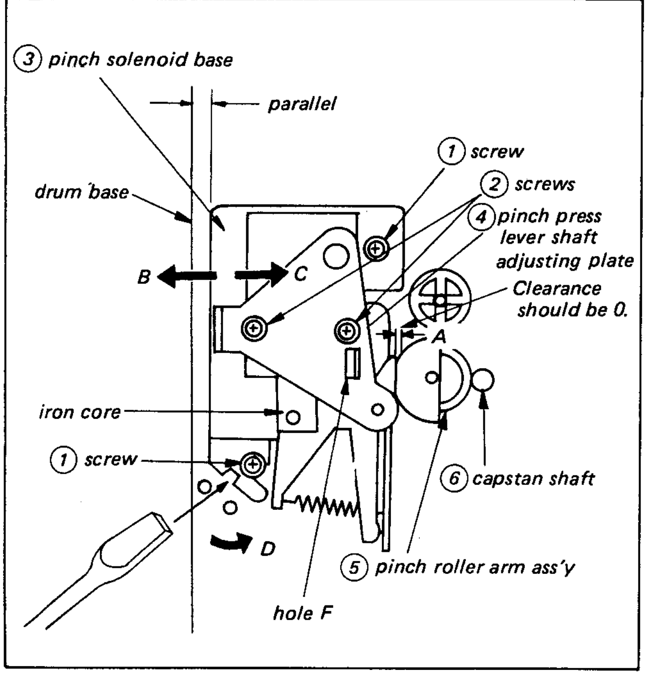
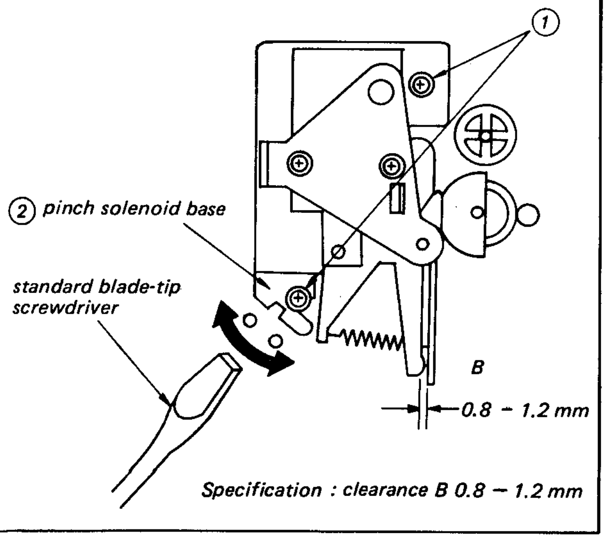

③ pinch solenoid base
parallel
① screw
② screws
④ pinch press lever shaft adjusting plate
Clearance should be 0.
drum base
B
C
A
iron core
① screw
⑥ capstan shaft
D
⑤ pinch roller arm ass'y
hole F

Fig. 3-32. Position adjustment of pinch roller solenoid

### 3-12-2. Position Adjustment of Pinch Solenoid

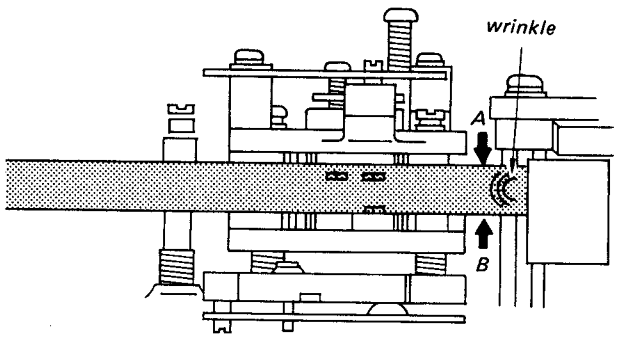
1. Check that "Parallelism Adjustment of Pinch Press Lever", Section 3-12-1, has been completed.
2. Loosen the two screws ① shown in Fig. 3-33 by 1/3 to 1/2 turns.
3. Insert the cassette (L-500) and set up the PLAY mode.
4. Insert the standard blade-tip screwdriver as shown in Fig. 3-33. Move pinch solenoid base ② in the arrow direction so that the specification at section B is satisfied, and tighten the two screws ①.


①
② pinch solenoid base
standard blade-tip screwdriver
B
0.8 – 1.2 mm

Specification : clearance B 0.8 – 1.2 mm

Fig. 3-33. Position adjustment of pinch solenoid

5. Tap the top and bottom of the tape around the capstan entrance and confirm that the specification shown in Fig. 3-34 is satisfied. If not, repeat Step 5 of Section 3-12-1, "Parallelism Adjustment of Pinch Press Lever".
6. Reverse Steps ① to ③ shown in Fig. 3-31.

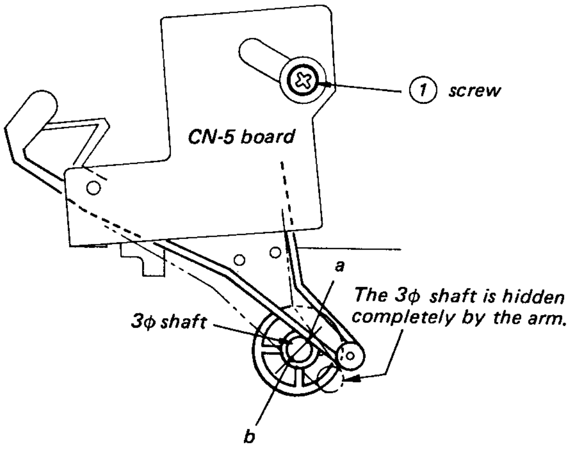


**Specification:** $|a-b| < 5$ sec
where
a ..... time required for wrinkle disappearance when tapping is made in the arrow A direction
b ..... time required for wrinkle disappearance when tapping is made in the arrow B direction

Fig. 3-34.

### 3-12-3. Position Adjustment of Slack Sensor Operation

1. Set up the STOP mode with the cassette. (Refer to Section 1-3.)
2. Loosen screw ① and adjust the CN-5 board position to satisfy the specification shown in Fig. 3-35.


① screw
CN-5 board
a
3ϕ shaft
The 3ϕ shaft is hidden completely by the arm.
b

**Specification:**
Reed switch must turn on between a and b.

Fig. 3-35. Position adjustment of slack sensor operation

## 3-13. ADJUSTMENT OF BRAKE RELEASE STROKE

- The FB slide plate shown in Fig. 3-36 releases the take-up, the supply, and the soft brakes.

1. Place the machine without the cassette into the STOP mode. (Refer to Section 1-3.)
2. Bend section E of FB slide plate ② so that the specification (0.5 to 1mm) of section C when brake release arm ① is pushed in the direction of arrow D so that the clearances at sections A and B are eliminated.
3. Set up the PLAY mode and check that the take-up, the supply, and the soft brakes are released.

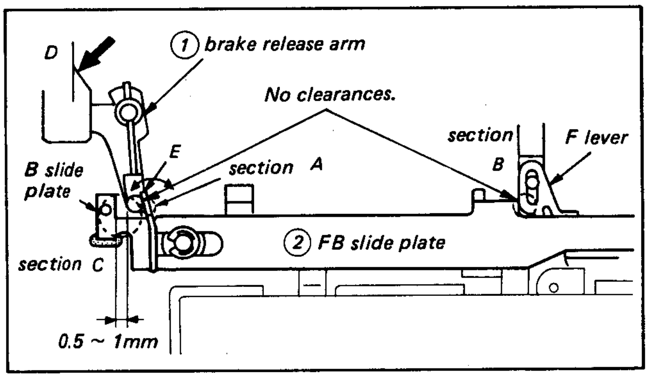

D
① brake release arm
No clearances.
section B
F lever
E
B slide plate
section A
② FB slide plate
section C
0.5 ~ 1mm

*Fig. 3-36. Position adjustment of FB slide plate*

## 3-14. POSITION ADJUSTMENT OF MICROSWITCH

### 3-14-1. Position Adjustment of Erasing Protection Microswitch

1. Remove the tuner block from the machine. (Refer to Section 1-1-2.)
2. Open the SY-11 board.
3. Check that the contact point of the erasing protection microswitch shown in Fig. 3-37 closes.
4. Loosen screws ② and adjust the position of the switch while lowering the cassette with lid opened so that the cassette stops at the position more than 1mm from the contact point of the switch opens.

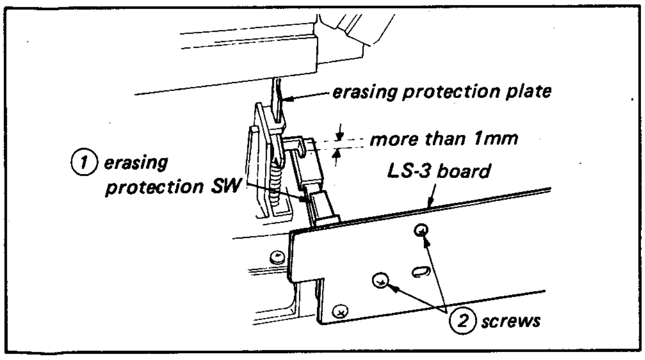

erasing protection plate
more than 1mm
① erasing protection SW
LS-3 board
② screws

*Fig. 3-37. Position adjustment of erasing protection microswitch*

### 3-14-2. Position Adjustment of Threading End Switch

- Prior to this adjustment, the following adjustments must be completed.

  3-9-5. Clearance adjustment of cassette lift assembly arm
  3-9-6. Clearance adjustment of ring arm
  3-9-7. Check of unthreading completion

1. Turn the threading ring by hand and stop it at the point immediately before the threading completion position.
2. Loosen screw ④ and adjust the position of microswitch ③ so that microswitch ③ turns on before gear pulley hold arm ① moves from the groove of lock arm ②, while turning the threading ring counterclockwise (↺) slowly by hand. Confirm the turning-on of the microswitch with a click.
3. Adjust the position further so that the clearance between the actuator of microswitch ③ shown in Fig. 3-38 and the microswitch satisfies the specification (0.7mm to 1.0mm) when the threading ring is turned counterclockwise (↺) beyond the threading completion point.
4. Repeat Steps 2 and 3 for confirmation.

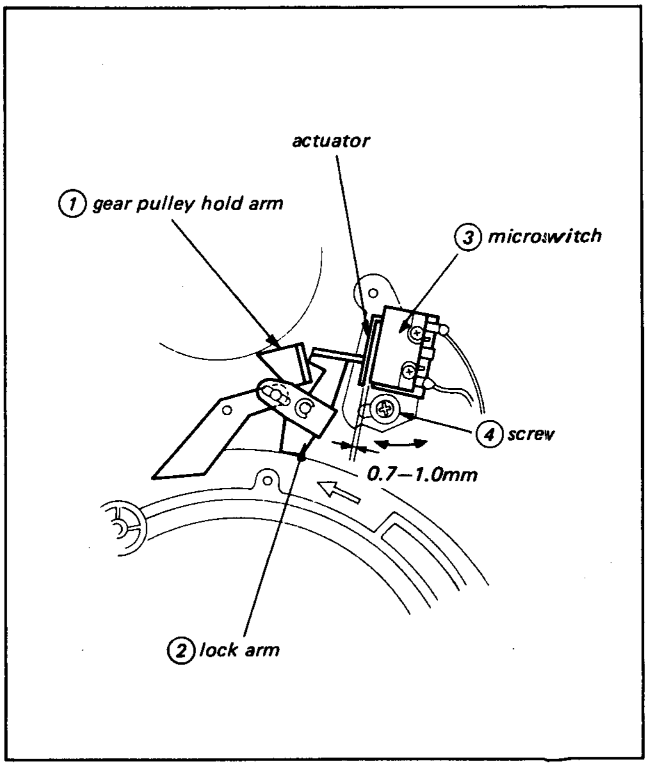

actuator
① gear pulley hold arm
③ microswitch
④ screw
0.7–1.0mm
② lock arm

*Fig. 3-38. Position adjustment of threading end switch*

## 3-15. CHECK OF TAKE-UP TORQUE

- Since sufficient take-up torque cannot be obtained at the last section of the tape if the take-up torque is below the specified value, tape slackness is caused at the capstan shaft point and sometimes the slack sensor operates.
- The take-up torque tends to increase gradully due to aging.

1. Rewind the tape a little and set up the PLAY mode (for the playback of the very last section of the tape) after the auto-stop at the tape end in the FAST FWD mode. Confirm that the tape runs without any slackness at the capstan shaft area. If the tape slackens, perform the following adjustments.
2. Clean the take-up reel table assembly, the FWD idler assembly, and the FWD belt with a piece of cloth dampened with isopropyl alcohol.
3. Stop the operation of the slack sensor. (Refer to section 1-4.)
4. Attach the reel table tension gauge (Tool Kit Ref. No. J-5) on the take-up reel table as shown in Fig. 3-39.
5. Pull out the string from the reel table tension gauge about 30 cm (12 inches) and hook the sector type tension gauge (50g full scale, Tool Kit Ref No. J-7) on the end of string.
6. Set up the PLAY mode.
7. Bring the sector type gauge toward the take-up reel table at a speed of approx. 2cm/sec. (8 inch/sec.) as shown in Fig. 3-39. Confirm that the gauge reading is within the specification. If not, replace the FWD limiter assembly and make the check again.

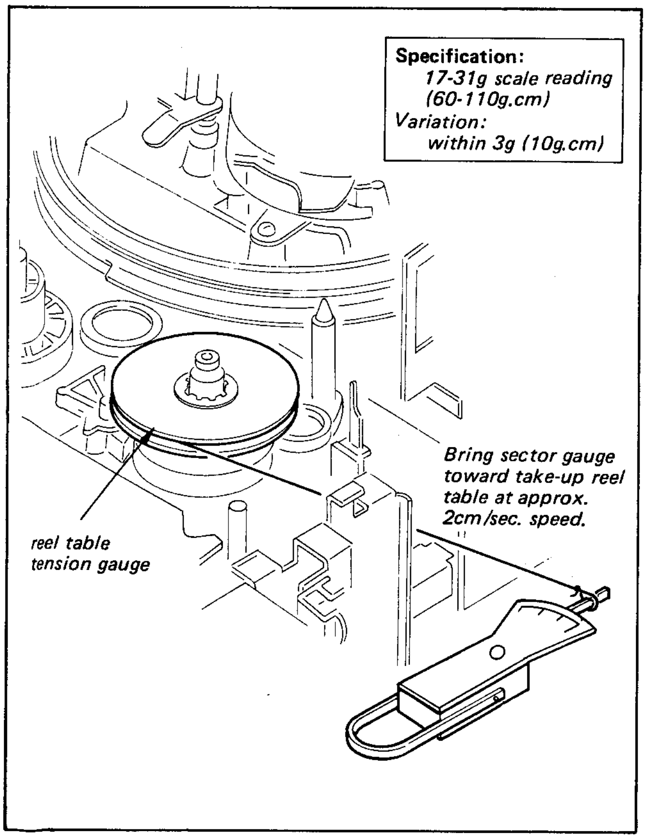

**Specification:**
*17-31g scale reading*
*(60-110g.cm)*
*Variation:*
*within 3g (10g.cm)*
*Bring sector gauge toward take-up reel table at approx. 2cm/sec. speed.*
*reel table tension gauge*

*Fig. 3-39. Check of take-up torque*

## 3-16. CHECK OF CASSETTE EJECT TORQUE

- The tape is taken up by the take-up reel table in the cassette EJECT mode. The take-up reel table is driven via the belt by the DC motor, while the threading ring unthreads.
- If the cassette eject torque is below the specification, only the threading ring performs the unthreading operation while the tape is not pulled back into the cassette, and the tape can be damaged.

1. Clean the take-up reel table, the E idler assembly, and the EJECT belt with a piece of cloth dampened with isopropyl alcohol.
2. Attach the reel table tension gauge (Tool Kit Ref. No. J-5) as shown in Fig. 3-40.
3. Pull out the string of the gauge about 30 cm (12 inches) and hook the sector type gauge (50g full scale, Tool Kit Ref. No. J-7) on the end of the string.
4. Set up the EJECT mode.
5. Bring the sector type gauge toward the take-up reel table at a speed of approx. 2cm/sec. during the unthreading as shown in Fig. 3-40. Confirm that the gauge reading is within the specification. If not, replace the E limiter assembly (X-3659-301-0) of the threading unit section and make the confirmation again.

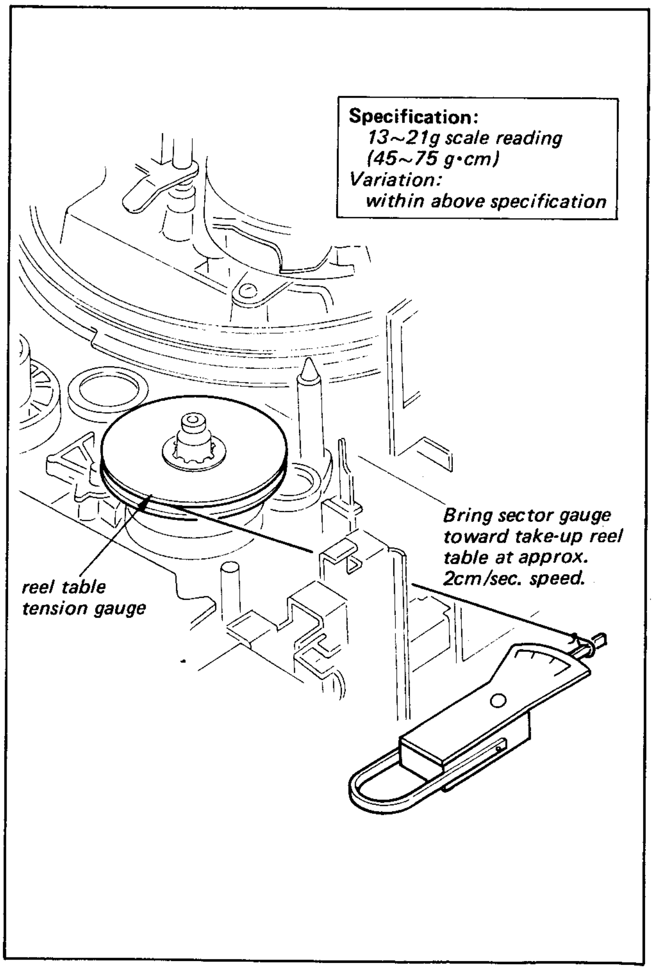

**Specification:**
*13~21g scale reading*
*(45~75 g•cm)*
*Variation:*
*within above specification*
*Bring sector gauge toward take-up reel table at approx. 2cm/sec. speed.*
*reel table tension gauge*

*Fig. 3-40. Check of cassette eject torque*

## 3-17. CHECK OF BRAKE TORQUE

- This machine has the supply brake, take-up brake, soft brake, and pause brake to stop the taking-up of the tape in the PAUSE mode. These brakes operate as follows.

| Reel table ass'y / Mode | Supply side | Take-up side |
|---|---|---|
| **Cassette EJECT mode** | Supply and soft brakes are ON. | Only take-up brake is ON. |
| **Threading mode** | Only soft brake is ON. (It is normal that the supply reel rotates a little, supplying tape.)<br>Soft brake torque; 15 to 30 g.cm. Reel table rotational direction is CW (↻). | Free (Tape is supplied from take-up side.) |
| **STOP mode** | Supply and soft brakes are ON.<br>Reel table rotational direction CW (↻): 100 to 500g.cm<br>Reel table rotational direction CCW (↺): 40 to 130g.cm | Only main brake is ON.<br>Reel table rotational direction CW (↻): 20 to 60g.cm<br>Reel table rotational direction CCW (↺): 60 to 500g.cm |
| **FF mode** | Only soft brake is ON. | Free (Tape is taken up to take-up side.) |
| **REW mode** | Free | Free |
| **PLAY mode** | Only FWD back tension brake band is ON. | Free (Tape is taken up to take-up side.) |
| **REC PAUSE mode & PLAY PAUSE mode** | FWD back tension brake is ON. | Take-up and pause brakes are ON. |
| **Unthreading mode** | Only soft brake is ON. (It is normal that supply reel rotates a little, supplying tape.) | Free (Tape is taken up to take-up side.) |

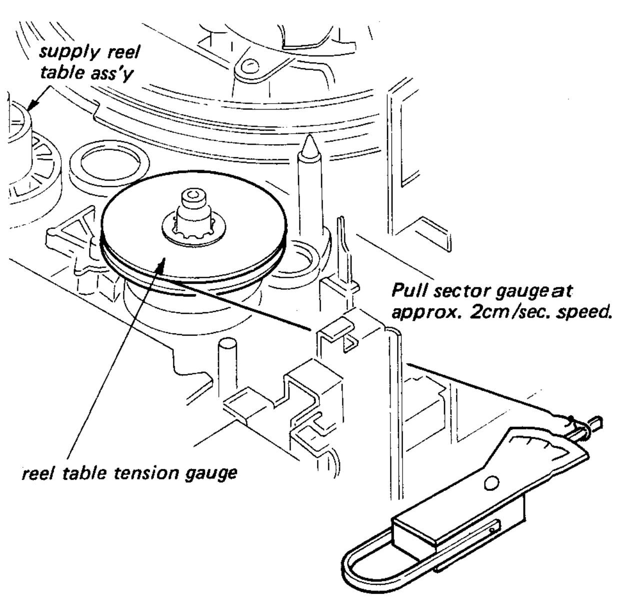
### 3-17-1. Check of Supply and Take-up Brake Operations

- When the tape slackens in when the mode is changed to STOP from PLAY and to STOP from REWIND, perform the check and adjustment, following the steps below.
- Since the slackness tends to occur when a wound diameter of the tape on a reel table is small, the check must be made in such a state.

1. Insert the cassette and set up the initial state of taking-up of the tape. (Rewind the tape and cue its beginning.)
2. Repeat the operation, changing the mode from PLAY to STOP two or three times and confirm that there is no tape slackness. If the tape slackens, perform steps 5 and 6 for adjustment.
3. Set-up the condition where the tape is about to be completely wound on the take-up reel. (Fast forward the tape and stop the tape movement at its end section.)
4. Repeat the operation, changing the mode from REWIND to STOP two or three times and confirm that no tape slackness occurs. If the tape slackens, perform Steps 5 and 6 for adjustment.
5. Remove the reel table assembly and clean the surface of the reel table assembly and the brake shoe with a piece of cloth dampened with isopropyl alcohol.
6. Clean the brake lining of the S and T brake with a piece of cloth dampened with isopropyl alcohol. If the tape still slacks even if the brake lining clean, replace them and perform the check again.

### 3-17-2. Check of Supply and Take-up Brake Torque

1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
2. Attach the reel table tension gauge (Tool Kit Ref. No. J-5) to the take-up reel table as shown in Fig. 3-41 and hook the sector type gauge (100g full scale, Tool Kit Ref. No. J-8) to the end of the string. Pull the sector type gauge at a speed of approx. 2 cm/sec. and read the gauge value.



*Note: This figure shows the take-up torque check. For supply brake torque check, set reel table tension gauge on supply reel table.*

*Fig. 3-41. Check of supply and take-up brake torque*

**Specification**

- When supply reel table ass'y rotates CW (↻): 100 to 500g.cm (Scale value is 29 to 143g.)
- When supply reel table ass'y rotates CCW (↺): 40 to 130g.cm (Scale value is 11 to 37g.)
- When take-up reel table ass'y rotates CW (↻): 20 to 60g.cm (Scale value is 6 to 17g.)
- When take-up reel table ass'y rotates CCW (↺): 60 to 500g.cm (Scale value is 17 to 143g.)

### 3-17-3. Check and Adjustment of Soft Brake Torque

1. Push the cassette detector lever by hand and release the lever during the threading. (In this condition, the supply and take-up brakes are released.)
2. Mount the reel table tension gauge (Tool Kit Ref. No. J-5) on the supply reel table as shown in Fig. 3-42 and hook the sector type guage (50g full scale, Tool Kit Ref. No. J-7) to the end of the string of the tension gauge.
3. Pull the sector type gauge at a speed of approx. 2cm/sec. and confirm that the gauge reading is within the specification. If the specification is not satisfied, change the position where the spring is hooked onto the soft brake and the F slide plate for adjustment and perform Steps 2 and 3.

**Specification:** *Scale reading . . . 4.5~9g (15~30g.cm)*

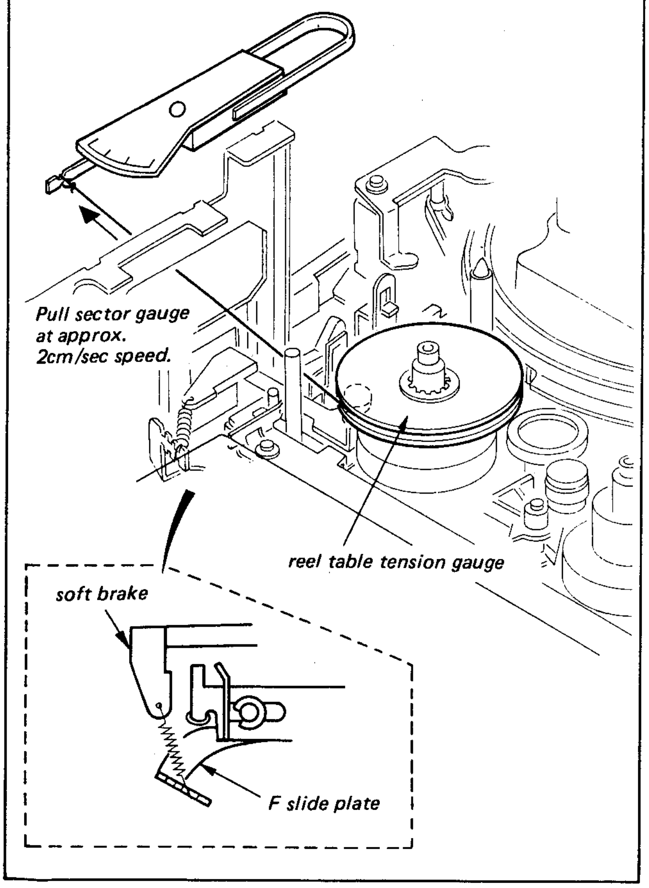


*Fig. 3-42. Check of soft brake torque*

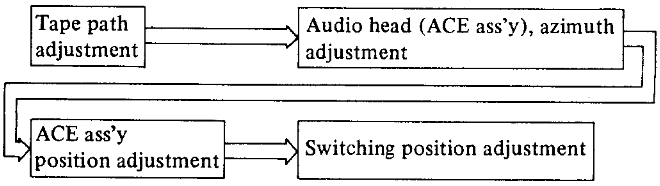
## 3-18. ADJUSTMENT OF FWD BACK TENSION

- The ideal measurement of the FWD back tension is to measure it under the same conditions as during the actual tape running state. The simple measurement procedure of the FWD back tension is described here. The measurement error due to the different measurement procedure is corrected in the specification.

1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
2. Place the FWD back tension jig (Tool Kit Ref. No. J-6) on the supply reel table assembly and thread the tape as shown in Fig. 3-43. Hook the sector type gauge (100g full scale, Tool Kit Ref. No. J-8) to the end of the tape.
3. Set up the PLAY mode.
4. Pull the sector type gauge at a speed of approx. 2cm/sec. and confirm that the gauge reading is within the specification. If not, perform Steps 5 and 6.
5. Loosen the screw mounting the BT adjusting plate and move the BT adjusting plate in the direction shown by the arrow for the adjustment.
6. Repeat Steps 2 to 4 again.

## 3-19. ADJUSTMENT OF TRACKING

- Sequence of tracking adjustment


Tape path adjustment
Audio head (ACE ass'y), azimuth adjustment
ACE ass'y position adjustment
Switching position adjustment

**[Preparation]**

1. Fixtures and Tools Required:
   Alignment tape (KR5-1H)
   Dual trace oscilloscope
   Inspection mirror
   Methanol or Isopropyl Alcohol
   Chamois
   3 mm flat tip screwdriver
2. Oscilloscope connection
   RF envelope waveform: TP2005 . . . . . RF-2 board
   External trigger: TP2003 . . . . . RF-2 board
   AUDIO OUT: TP3406 . . . . . AS-3 board
   VIDEO OUT: TP1017 . . . . . YC-6 board
   Switching waveform: TP2003 . . . . . RF-2 board

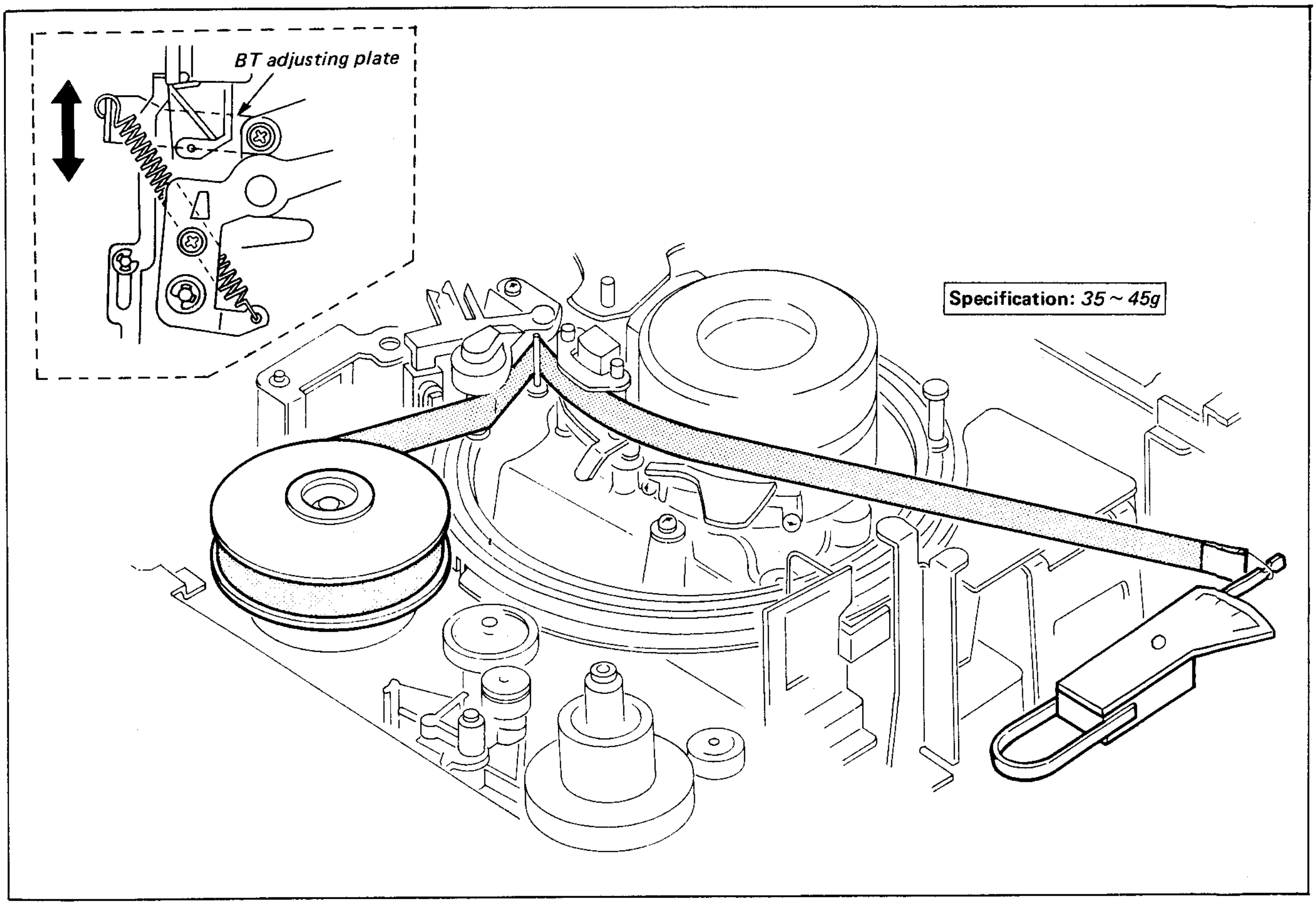

BT adjusting plate
Specification: 35 ~ 45g

Fig. 3-43. Adjustment of FWD back tension

4. Location of circuit boards

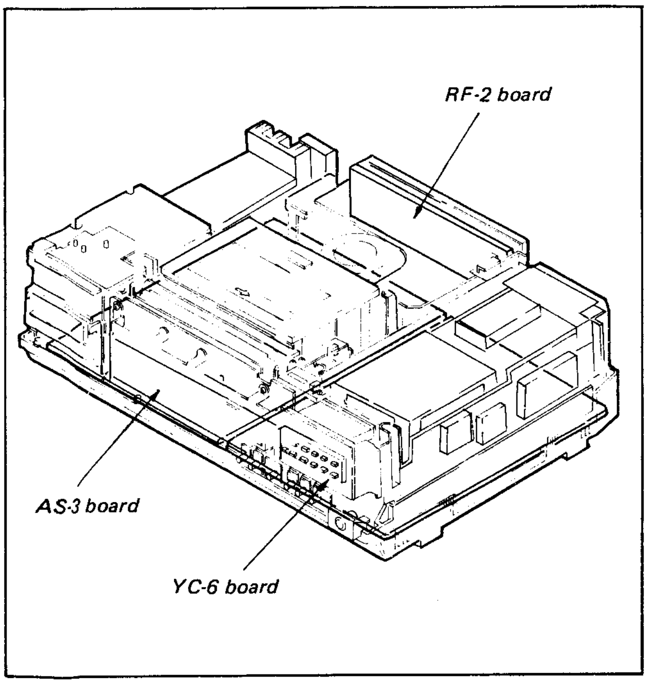

RF-2 board
AS-3 board
YC-6 board

Fig. 3-44. Location of circuit boards

5. Location tape guides

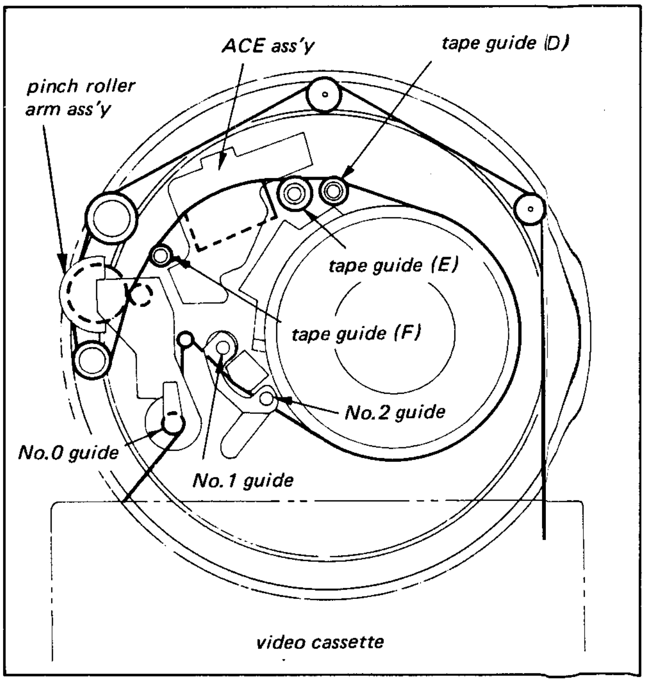
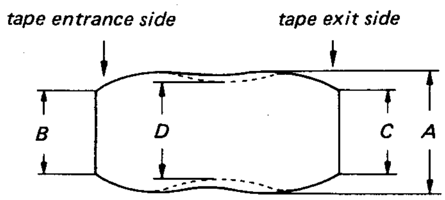

ACE ass'y
tape guide (D)
pinch roller arm ass'y
tape guide (E)
tape guide (F)
No.2 guide
No.0 guide
No.1 guide
video cassette

Fig. 3-45. Location of tape guides

### 3-19-1. Adjustment of Tape Path

- Perform this adjustment carefully because poor adjustment reduces tape interchangeability and picture quality.

1. Clean the tape movement faces (the tape guide, drum, capstan and pinch roller) with chamois dampened with methanol or isopropyl alcohol.
2. Connect the oscilloscope to TP-2005 on the RF-2 board and the external trigger to TP-2003.
3. Play back the 1 MHz segment of the alignment tape (KR5-1H).
4. Confirm that the RF output waveform envelope on the oscilloscope screen increases and decreases, while remaining flat, when the TRACKING control knob is turned to the left and the right from its center detent position. If the RF waveform does not increase and decrease while remaining flat, perform Step 6 for the adjustment.


tape entrance side
tape exit side
B
D
C
A

**Specification:**
*TRACKING control knob at optimum position.*
*tape-to-head*

*contact:* $\frac{B}{A} \geqq 0.7$

$\frac{C}{A} \geqq 0.7$

*variation:* $\frac{D}{A} \geqq 0.9$

*Fig. 3-46. Adjustment of tape path*

5. Confirm that the fluctuation and the tape-to-head contact satisfy the specification shown in Fig. 3-46. If they do not, perform Step 6 for the adjustment.

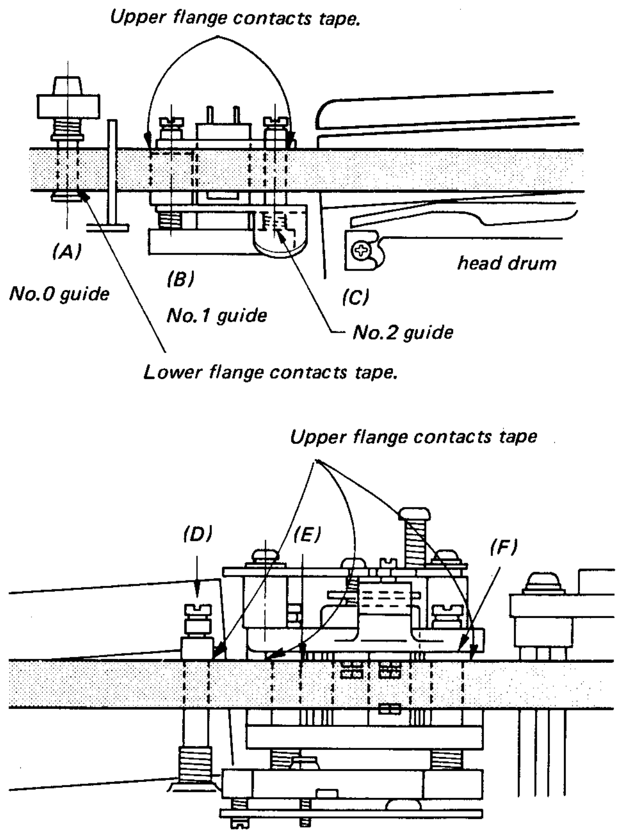

Upper flange contacts tape.
(A)
No.0 guide
(B)
No.1 guide
(C)
No.2 guide
head drum
Lower flange contacts tape.
Upper flange contacts tape
(D)
(E)
(F)

*Fig. 3-48. Adjustment of tape path*

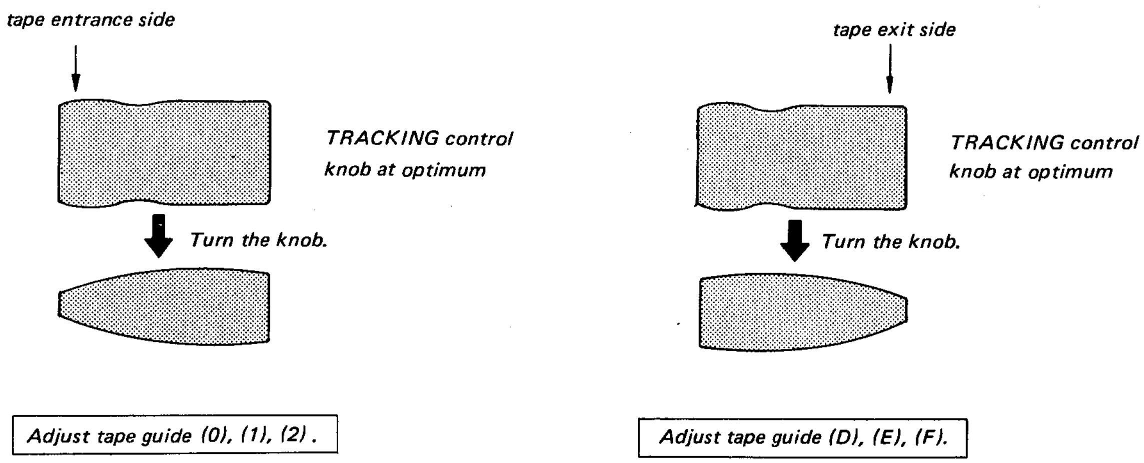

tape entrance side
TRACKING control knob at optimum
Turn the knob.
Adjust tape guide (0), (1), (2).
tape exit side
TRACKING control knob at optimum
Turn the knob.
Adjust tape guide (D), (E), (F).

*Fig. 3-47. Adjustment of tape path*

6. When the waveform at the tape entrance side is not flat as shown in Fig. 3-47 for the clockwise and counterclockwise turning of the TRACKING control knob from center, detent position, adjust the heights of tape guides (0), (1), and (2). When the waveform at the tape exit side is not flat, adjust the heights of tape guides (D), (E), and (F). The height adjustment must be performed so that the tape contacts the drum heads, and there is a minimum curl (not more than 2 mm) at the flange of each tape guide, the upper or lower flanges contact the tape as shown in Fig. 3-48, and the RF waveform is flat.

   **Note:** The construction of the ACE assembly enables the assembly to be adjusted so that its top plate is perpendicular to the face of the moving tape as a whole, but this "Zenith" adjustment is not necessary except after ACE assembly replacement.
   Since tape guide (D) regulates the movement of the tape around the drum exit, raise tape guide (D) about 0.5 mm before the adjustment of the tape path on the exit side. Then lower tape guide (D) to the point immediately before the RF waveform varies, and with less than 2 mm curl after the tape path adjustment.

## 3-19-2. Adjustment of Exit Side Tracking after ACE Assembly Replacement

1. The ACE assembly can be removed if the three screws shown in Fig. 3-49 are removed.

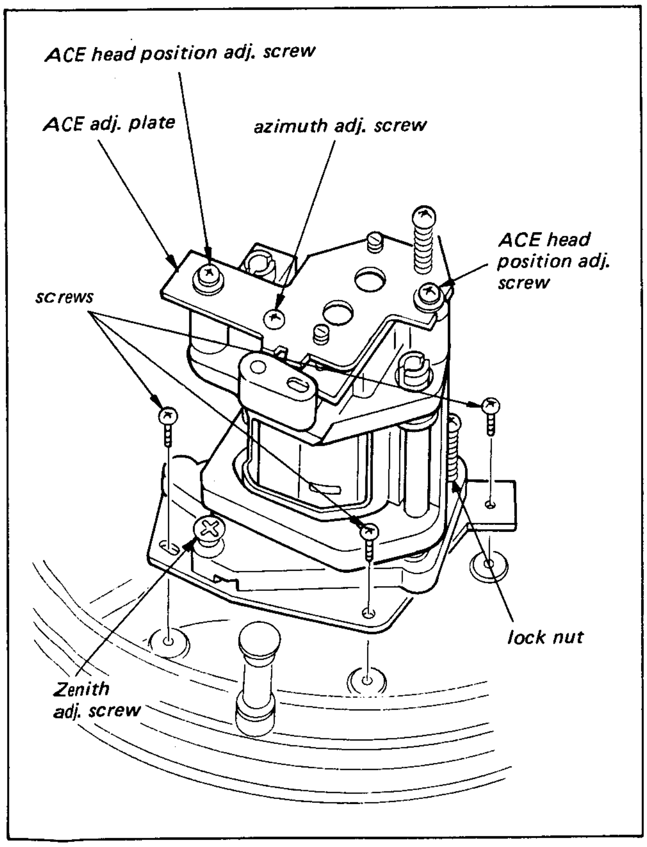


*Fig. 3-49. Removal of ACE assembly*

2. Perform the adjustment following Step 3 after the completion of the replacement.
3. Raise the tape guide (D) shown in Fig. 3-48 by 0.5 mm. (Turn the nut one turn.)
4. Play back the 1 MHz segment of the alignment tape (KR5-1H). Confirm that the RF wave output (see Fig. 3-46) satisfies the specification and there is a minimum curl (not more than 2 mm) on the tape edge contacting the tape guide. Confirm that the RF waveform varied from the flat state when the tape guides (E) and (F) are raised and adjust the heights of the tape guides so that the waveform output becomes flat.
5. When the waveform does not vary if the tape guides (E) and (F) are raised in Step 4 or when the waveform does not become flat if the tape guides are lowered, perform the adjustment, following the procedure below.
   (i) Loosen the lock nut shown in Fig. 3-49.
   (ii) Turn the zenith adjusting screw counterclockwise (↺) a little more than 30 degrees and turn it clockwise (↻) until the screw returns to the point 30 degrees counterclockwise from its original point.
   (iii) Perform Step 4 again. If the specification is not satisfied, perform Step 5 again. Since the ACE assembly was adjusted perpendicularly when assembled at the factory, do not turn the zenith adjusting screw more than 60 degrees to the right and left from the original position.
   (iv) After the adjustment, tighten the lock nut until a slight resistance for the tightening is felt and confirm that the specification in Step 4 is satisfied.
6. When there is an edge curl at the tape contacting the tape guide in Step 4, perform the adjustment, following the procedure below.
   (i) Loosen the lock nut shown in Fig. 3-49.
   (ii) Tighten the zenith adjusting screw clockwise only 15 degrees.
   (iii) Perform Step 4 again. If the specification is not satisfied, perform Steps 5 and 6 again, but do not turn the zenith adjusting screw to the right and left more than 60 degrees from its original position.
   (iv) Tighten the lock nut until a slight resistance is felt after the adjustment. Confirm that the specification in Step 4 is satisfied.

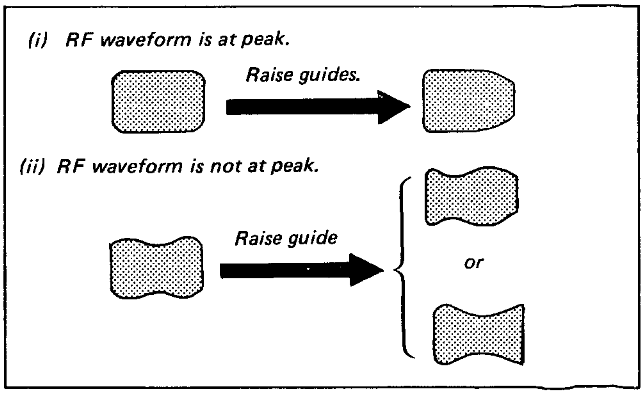


*Fig. 3-50. Adjustment of exit side tracking after ACE assembly replacement*

### 3-19-3. Audio Head Azimuth Adjustment

**[Connection of Relative Equipment]**

The connections of the equipments to the input/output terminals are shown in Fig. 3-51.

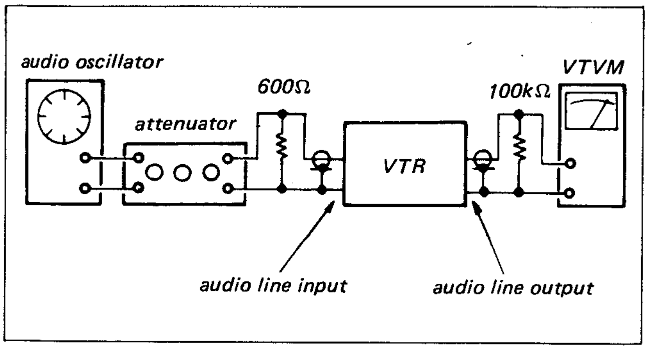

audio oscillator
600Ω
attenuator
VTR
100kΩ
VTVM
audio line input
audio line output

*Fig. 3-51. Connections*

1. Terminate the audio line output terminal with a 100 kΩ resistor and connect a VTVM.
2. Play back the 5 kHz signal segment of the alignment tape.
3. Adjust the azimuth adjustment screw on the audio head for a maximum VTVM reading. (See Fig. 3-51).

   **Note:** Loosen azimuth adjustment screw before the adjustment and tighten it after the completion.

### 3-19-4. Position Adjustment of ACE Assembly

- This adjustment includes the mechanical head mounting position adjustment and the electrical tracking control center adjustment.
- The adjustment sequence is to perform the tracking control center adjustment and then the mechanical adjustment of the head mounting position. If this sequence is reversed, poor tracking occurs.

1. Connect a dual-trace oscilloscope as follows.

   CH-1 . . . . . . . . . . . . . . TP-2005 (RF-2 board)
   CH-2 . . . . . . . . . . . . . . TP-3406 (AS-3 board)
   Ext trigger . . . . . . . . . . TP-2003 (RF-2 board)

2. Play back the 1 MHz segment of alignment tape KR5-1H. (See Fig. 3-52).
3. Set the tracking control to the center, detent, position and confirm that the output waveform level is maximum and the 0 level point of the audio signal appears at the Bch waveform point as shown in Fig. 3-52. If the specification is not satisfied, perform the following Step 4.

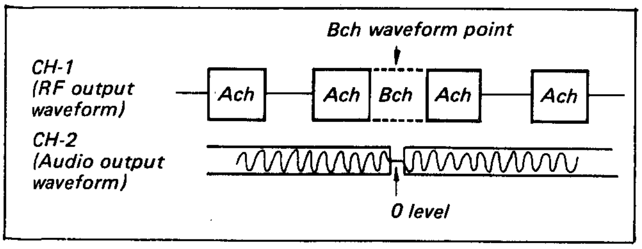

Bch waveform point
CH-1
(RF output waveform)
Ach
Ach
Bch
Ach
Ach
CH-2
(Audio output waveform)
0 level

*Fig. 3-52. Position adjustment of ACE assembly (1)*

4. Perform the tracking control center adjustment. [Refer to section 4-3-2(2)].
5. Set the TRACKING control knob to its center detent point and play back the 1 MHz segment of the alignment tape (KR5-1H).
6. Loosen the two position adjusting screws of the ACE head and adjust the cut-out section of section A for maximum RF output waveform and a 0 level of audio signal at the Bch waveform point. (See Fig. 3-52.)

   **Note:** Perform the adjustment so that the center of the cut-out section of the A section will almost match the center of the round hole.

7. Play back the 1 MHz segment of the alignment tape and confirm the proper picture appearance.
8. Tighten the position adjusting screw of the ACE head.

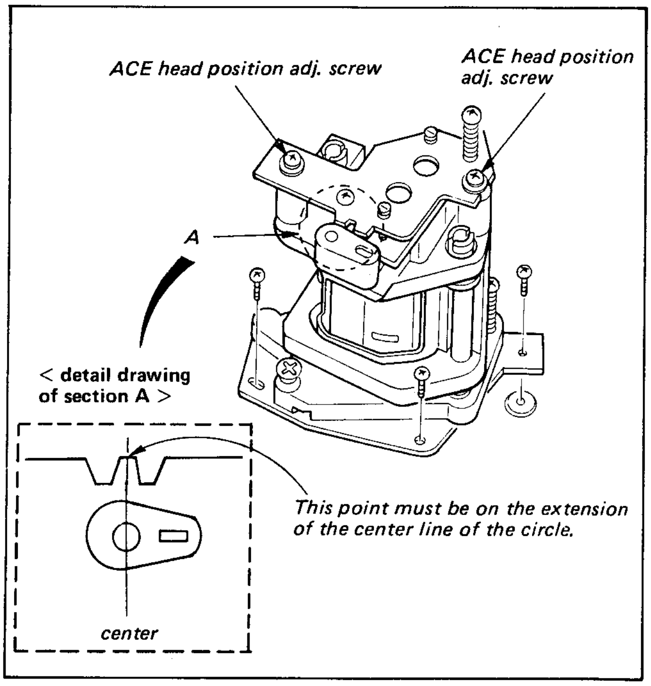

ACE head position adj. screw
ACE head position adj. screw
A
< detail drawing of section A >
This point must be on the extension of the center line of the circle.
center

*Fig. 3-53. Position adjustment of ACE assembly (2)*

### 3-19-5. Video Head Dihedral Adjustment

- Generally this adjustment is not necessary except after the video head disk replacement.

  **Note:** The dihedron of a video head disk for replacement purposes was adjusted precisely with a microscope at the factory and the readjustment is usually not necessary.

- The ACE assembly position adjustment has been completed prior to this dihedral adjustment.
- The judgment of the video head dihedron must be performed in the condition that the monoscope signal segment of the alignment tape (KR5-1H) is played back and the TRACKING control knob is set to the center detent position. (See Fig. 3-54.)

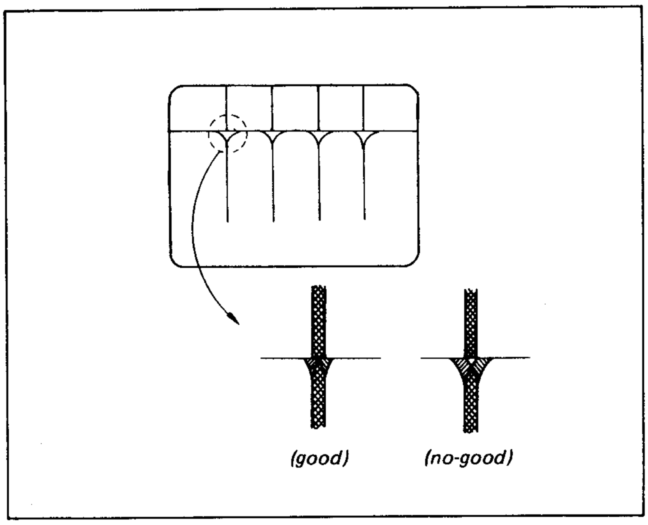

(good)
(no-good)

Fig. 3-54.

- When the dihedron is no-good, the preparation of the video head dihedral adjustment is to install two dihedral adjusting screws in the holes close to the small mark (●) shown in Fig. 3-55 and tighten them until the screw heads are level with the top surface of the video head disk. (If the screws are not tightened until their heads become level with the surface, the upper drum of the video head disk is caught by the adjusting screw heads and the video head disk cannot rotate. If the screws are tightened excessively, the head base is moved and the dihedral distortion becomes larger.)

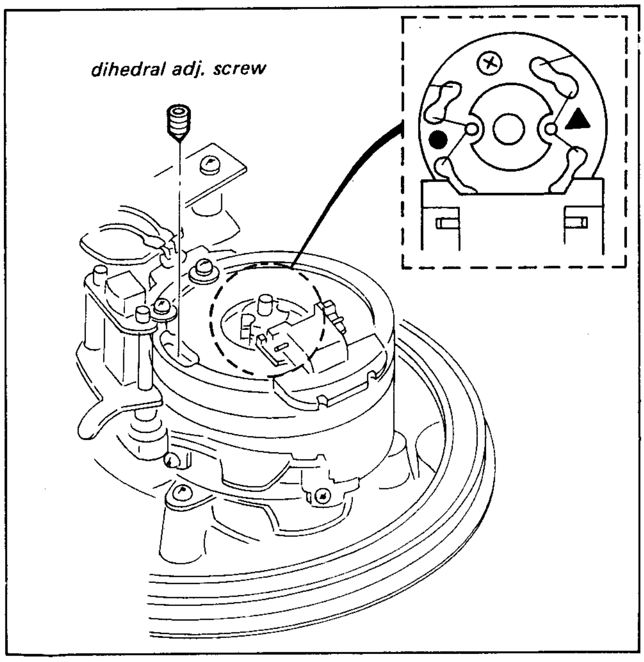

dihedral adj. screw

Fig. 3-55.

**When the dihedron is no-good;**

(1) When the split becomes small for the clockwise turn of the TRACKING control knob, the B head shifts by C in the arrow direction as shown in Fig. 3-56 and is tracing the magnetic pattern on the tape. The adjusting screw in adjustment hole E shown in the figure must be tightened further to shift the B head in the left direction until the good dihedron shown in Fig. 3-54 is obtained.
Set the TRACKING control knob to the center detent point.

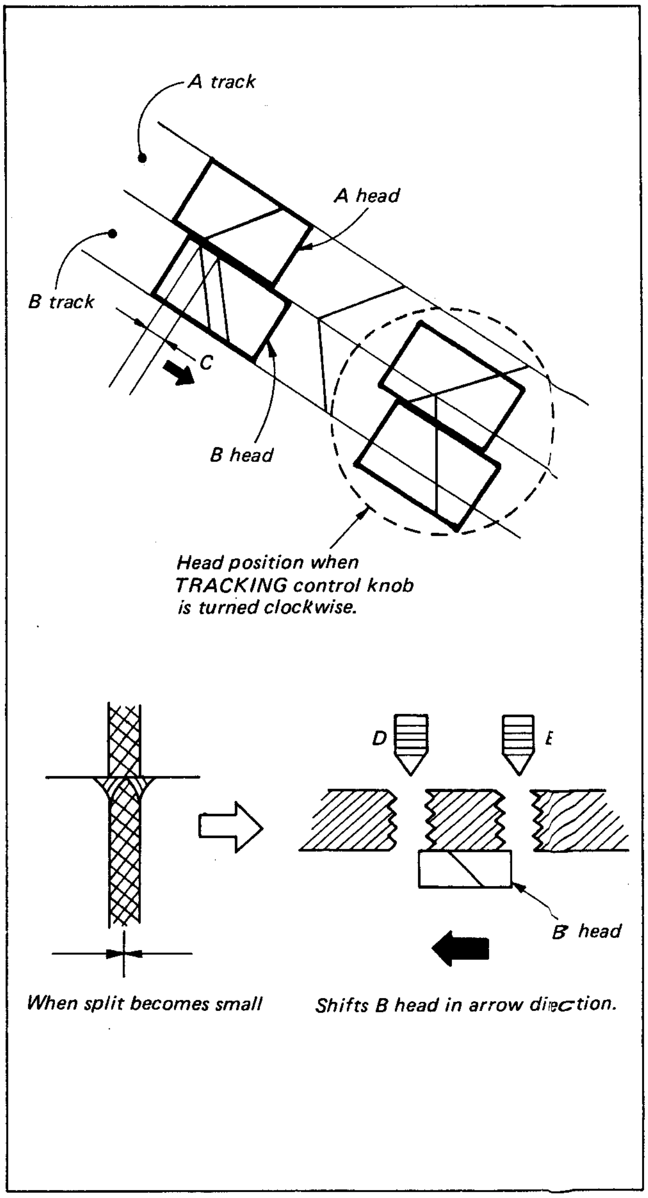
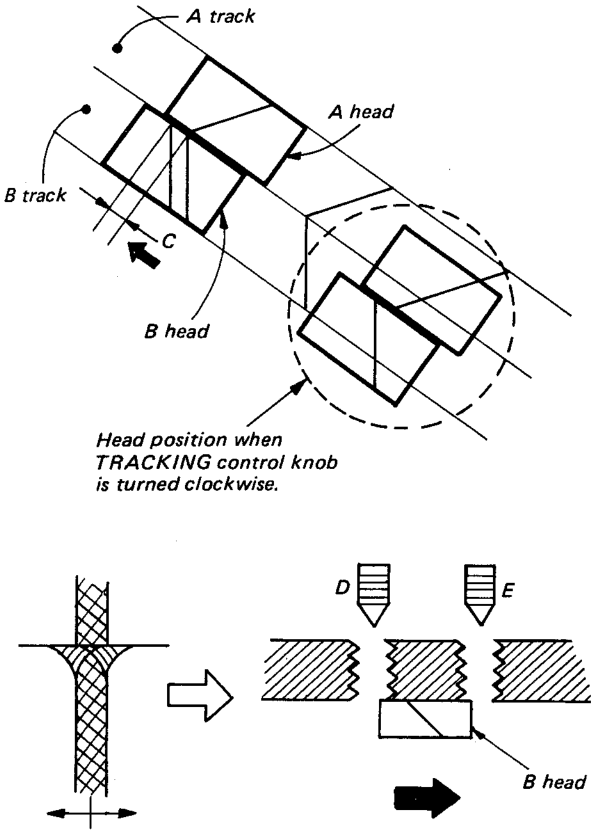

A track
A head
B track
C
B head
Head position when TRACKING control knob is turned clockwise.
D
E
B head
When split becomes small
Shifts B head in arrow direction.

Fig. 3-56.

(2) When the split becomes large for the clockwise turn of the TRACKING control knob, the B head shifts by C in the arrow direction as shown in Fig. 3-57 and is tracing the magnetic pattern. The adjusting screw in adjustment hole D shown in the figure, must be tightened further to shift the B head in the right direction until the good dihedron shown in Fig. 3-54 is obtained.
Set the TRACKING control knob to the center detent point.


A track
A head
B track
C
B head
Head position when
TRACKING control knob
is turned clockwise.
D
E
B head

When split becomes large

Shift B head in arrow direction.

Fig. 3-57.

(3) Remove the adjusting screws after the completion of the adjustment and check the dihedron again.

# SECTION 4
# ELECTRICAL ALIGNMENT

All the electrical alignment can be performed by using the equipment mentioned below, the alignment tape, and the PAL colour bar signal (100%).

**[Equipment Required]**

(1) Colour Monitor TV

(2) Oscilloscope, Dual-trace, Bandwidth . . . more than 10 MHz with delay mode

(3) Frequency Counter

(4) PAL Colour-Bar Generator

(5) Digital voltmeter

(6) VOM (20 KΩ/V)

(7) Audio Signal Generator

(8) Vectorscope

(9) Attenuator

(10) Alignment Tape, type: KR5-1H, Code No. 8-969-995-91

(11) Alignment Tool (Adjusting screwdriver for semi-fixed resistors and coils)
Jig No. SL-0001, Code No. J-6080-001-A

**[Setup for Alignment]**

The antenna should be connected correctly to the antenna input terminal of the videocassette recorder.

It is important that the video output signal satisfies the specification because the telecast signal received by the incorporated tuner of the videocassette recorder is utilized as the adjustment signal of the machine. The incorporated tuner should be set to the channel with the best reception. The video signal should be checked with an oscilloscope connected to TP-15 on the YC-6 board. Verify that the sync signal amplitude is approx. 0.3 Vp-p and the video signal amplitude is approx. 0.7 Vp-p at peak. Adjust the fine tuning while observing the signal and the TV screen so that the burst signal amplitude becomes approx. 0.3 V ± 0.1 Vp-p. Also confirm that there is no spikes observed at the sync signal portion. (See Fig. 4-1.)

The video (colour bar) signal for the alignment is shown in Fig. 4-1.

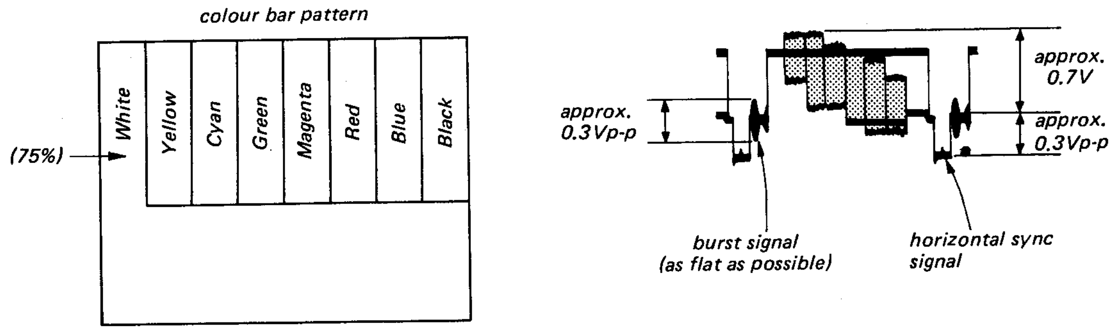


*Fig. 4-1. Video (colour bar) signal*

**[Alignment Tape]**

**KR5-1H**

| | Video signal | Audio signal | Playing time | Use for |
|---|---|---|---|---|
| 1. | Colour bars | 3 kHz – 5 dB | 5 min | General performance, tape speed checks, switching position adjustment. |
| 2. | Monoscope | 333 Hz – 25 dB | 5 min | Video head dihedral, audio level adjustment. |
| 3. | RF sweep | 5 kHz – 25 dB | 5 min | Video, audio frequency characteristics, audio azimuth adjustment<br>marker: 1, 2, 3.58, 4.5, 5.2 MHz |
| 4. | Tracking<br>1 MHz (CH-B)<br>*1 (Channel B is inserted in every 3 frames.) | 1 kHz – 5 dB<br>*2 (Signal is dropped out in the positions where channel B is inserted.) | 5 min | Tracking, Audio height adjustments CTL Position check<br>(Check if *1 and *2 are the same position.) |

**[Alignment Tool for Semi-fixed Variable Resistors and Coils]**

Semi-fixed variable resistors and inductances should be adjusted with the alignment tool exclusively prepared for the adjustment of the components. A common screwdriver is too large for adjusting the components from the conductor side of a printed cricuit board.

The metal blade of the alignment tool is used for variable resistors and trimmer capacitors and the plastic tip is used for variable inductances.

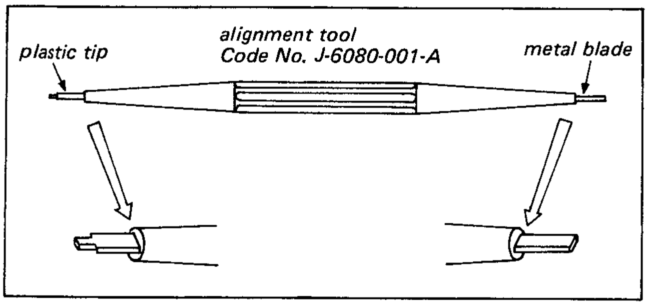

plastic tip
alignment tool
Code No. J-6080-001-A
metal blade

*Fig. 4-2. Alignment tool*

**[Required Levels and Impedances of Input and Output]**

VIDEO

Input ........... VIDEO IN: BNC connector 1.0 Vp-p, 75 ohms unbalnced, sync negative

Output ........ VIDEO OUT: BNC connector 1.0 Vp-p, 75 ohms unbalanced, sync negative

AUDIO

Input .......... AUDIO IN: Phono connector, 47 kohms, −10 dBs MIC: mini jack, −60 dBs, suitable for microphone with 600-ohm impedance

Output ......... AUDIO OUT: Phono connector, Less than 10 kohms, −5 dBs (47 kohm load), unbalanced

**[Colour Bar Signal]**

The 100% colour bar signal recorded on the Alignment tape is shown in Fig. 4-3.

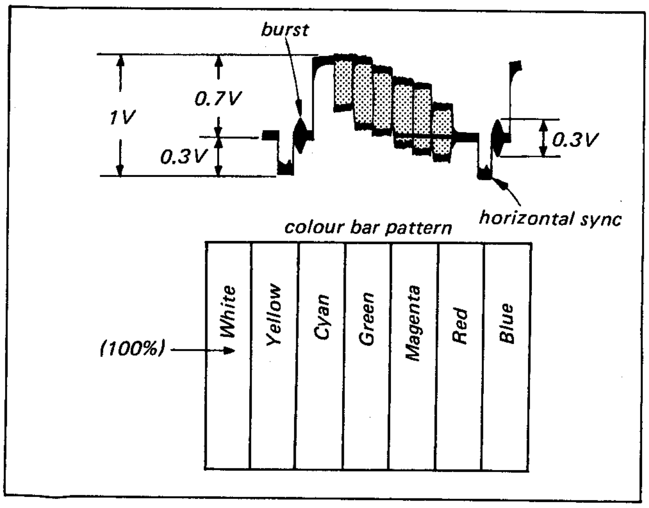
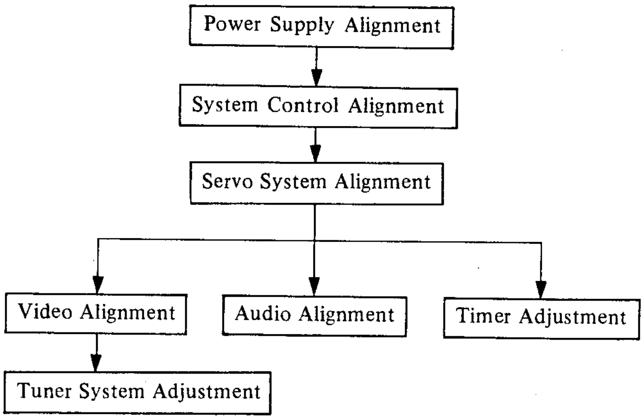

burst
1V
0.7V
0.3V
0.3V
colour bar pattern
horizontal sync
(100%)
White
Yellow
Cyan
Green
Magenta
Red
Blue

*Fig. 4-3. Colour bar signal recorded on the alignment tape*

**[Alignment Sequence]**

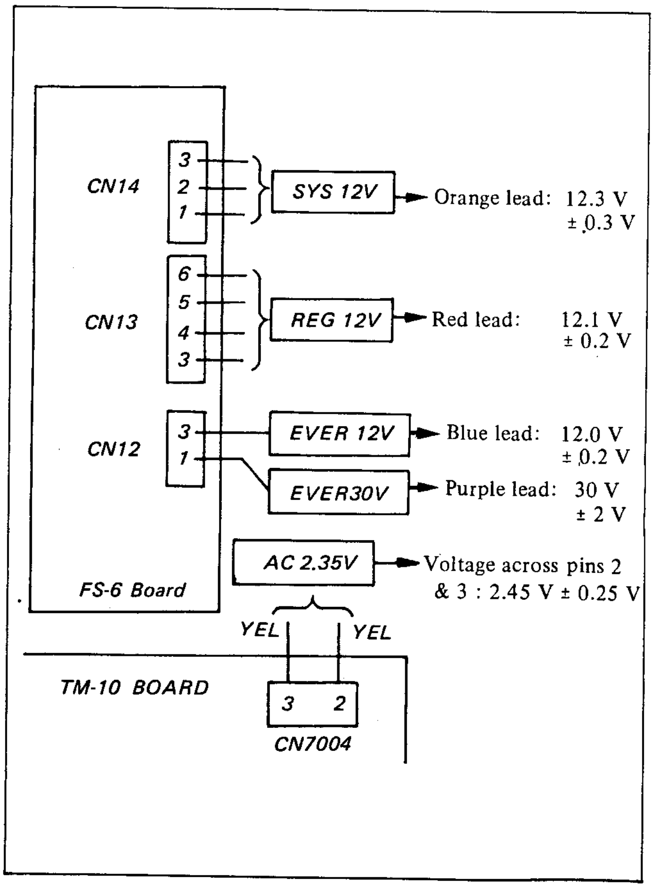
The alignment should be performed following the sequence below.


Power Supply Alignment
System Control Alignment
Servo System Alignment
Video Alignment
Audio Alignment
Timer Adjustment
Tuner System Adjustment

## 4-1. POWER SUPPLY ALIGNMENT AND CHECK

1. Output Voltage Check (FS-6 board)

**Note:** Set up the E-E mode.


CN14
3
2
1
SYS 12V
Orange lead: 12.3 V ± 0.3 V
CN13
6
5
4
3
REG 12V
Red lead: 12.1 V ± 0.2 V
CN12
3
1
EVER 12V
Blue lead: 12.0 V ± 0.2 V
EVER30V
Purple lead: 30 V ± 2 V
AC 2.35V
Voltage across pins 2 & 3 : 2.45 V ± 0.25 V
FS-6 Board
YEL
YEL
TM-10 BOARD
3
2
CN7004

2. REG 12 V Adjustment (Switching Regulator)
    (1) Remove the upper case of the switching regulator.

    **Note:** Connect the connector and the earth line (black) as they were.

    (2) Set up the E-E mode.
    (3) Connect the VOM to pin 2 (REG 12 V) of CN13 on the FS-6 board.
    (4) Adjust RV201 for 12.1 V ± 0.2 Vdc.
3. SYS 12 V Adjustment (Switching Regulator)
    (1) Remove the upper case of the switching regulator.

    **Note:** Connect the connector and the earth line (black) as they were.

    (2) Set up the E-E mode.
    (3) Connect the VOM to pin 1 (Sys 12 V) of CN14 on the FS-6 board.
    (4) Adjust RV202 for 12.3 V ± 0.3 Vdc.

## 4-2. SYSTEM CONTROL ALIGNMENT AND CHECK (SY-10 & SY-11 board)

1. Clock Oscillating Frequency Adjustment (SY-10 board)
    (1) Connect the frequency counter to pin 42 of IC502.

    **Note:** The input impedance of the frequency counter should be more than 10 MΩ.

    (2) Adjust T501 for 400 kHz ± 0.5 kHz. (See Fig. 4-2-1.)

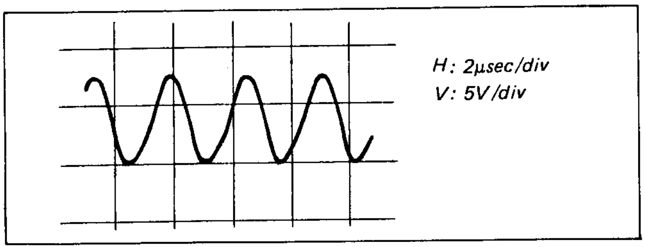


*Fig. 4-2-1. Adjustment of clock oscillating frequency*

2. Clock Oscillating Frequency Adjustment (SY-11 board)
    (1) Connect the frequency counter to pin 43 of IC06.

    **Note:** The input impedance of the frequency counter should be more than 10 MΩ.

    (2) Adjust T1 for 400 kHz ± 0.5 kHz. (See Fig. 4-2-1.)
3. Clock Oscillating Frequency Adjustment (SY-11 board)
    (1) Connect the frequency counter to pin 42 of IC07.

    **Note:** The input impedance of the frequency counter should be more than 10 MΩ.

    (2) Adjust T2 for 400 kHz ± 0.5 kHz. (See Fig. 4-2-1.)

4. Threading Check
    (1) Load a cassette.
    (2) Check that the threading is performed.
    Threading time: about 3 seconds
5. Unthreading Check
    (1) Press the EJECT button.
    (2) Check that the unthreading is performed as soon as the EJECT lamp turns on, the lamp turns off after the completion of the unthreading, and the cassette lift assembly rises.
    Unthreading time: about 4 seconds
6. Auto-Rewind Check
    (1) Check that the auto-rewind is done automatically so that the tape is rewound at the tape end in the F.FWD, REC, PB, or CUE mode after the end alarm sounds 10 seconds if the END ALARM switch is in the on position.

## 4-3. SERVO SYSTEM ALIGNMENT

### 4-3-1. Drum Servo System Adjustment

1. Drum Free Speed Adjustment (AS-3 board)
    (1) Set up the REC mode.
    (2) Connect the oscilloscope as follows.

    CH-1 . . . . . pin 1 of IC1
    CH-2 . . . . . pin 7 of IC1

    (3) Confirm that the waveform locks as shown in Fig. 4-3-1.

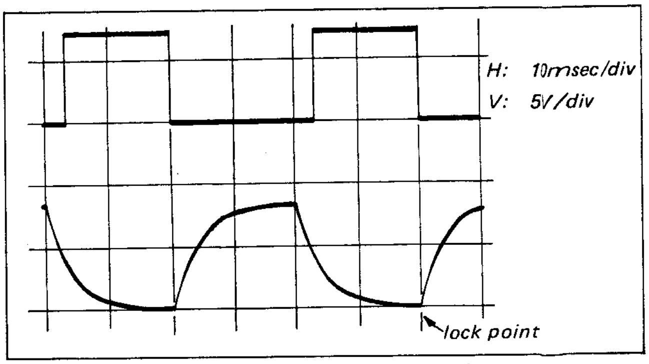


*Fig. 4-3-1. Drum free speed adjustment*

    (4) Connect the CH-1 probe of the oscilloscope to TP2 (pin 10 of IC1).

    Input range: DC

    (5) Adjust RV10 for 5.2 V ± 0.3 V. (See Fig 4-3-2.)

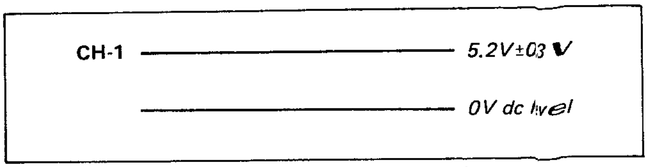


*Fig. 4-3-2. Drum free speed adjustment*

2. RF Switching Position Adjustment (YC-6, RF-2, & AS-3 boards)

   (1) Play back the coulor bar segment of the alignment tape.

   (2) Connect the oscilloscope to TP5 on the RF-2 board.

   (3) Adjust the TRACKING knob for maximum output. (See Fig. 4-3-3.)

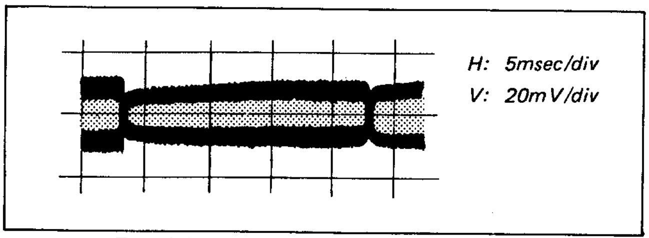


*Fig. 4-3-3. RF output level adjustment*

   (4) Connect the oscilloscope as follows.
   CH-1 ..... TP1/AS-3 board
   CH-2 ..... Emitter of Q34/YC-6 board

   (5) Adjust RV2 on the AS-3 board so that the phase difference between the falling section of the CH-1 waveform and the vertical sync signal of the CH-2 video signal are 7 H ± 2 H. (See Fig. 4-3-4.)

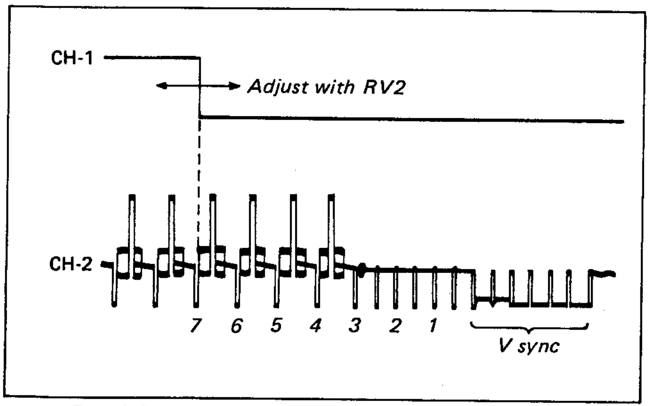


*Fig. 4-3-4. RF switching position adjustment (1)*

   (6) Adjust RV1 on the AS-3 board so that the phase difference between the rising section of the CH-1 waveform and the vertical sync signal of the CH-2 video signal are 7 H ± 2 H. (See Fig. 4-3-5.)

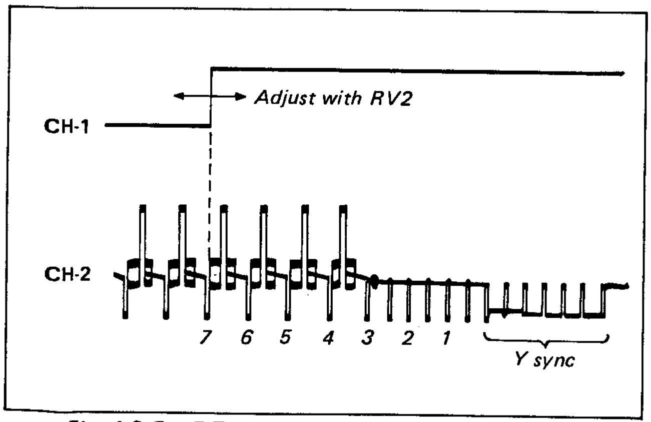


*Fig. 4-3-5. RF switching position adjustment (2)*

3. Record-Servo Lock Phase Adjustment (YC-6 & AS-3 boards)

   (1) Record a video signal.

   (2) Connect the oscilloscope as follows.
   CH-1 ..... TP1/AS-3 board
   CH-2 .....,pin 20 of IC1/YC-6 board

   (3) Adjust RV3 on the AS-3 board so that the phases of the falling section of the CH-1 waveform and the vertical sync signal of the CH-2 video signal are 7 H ± 2 H. (See Fig. 4-3-6.)

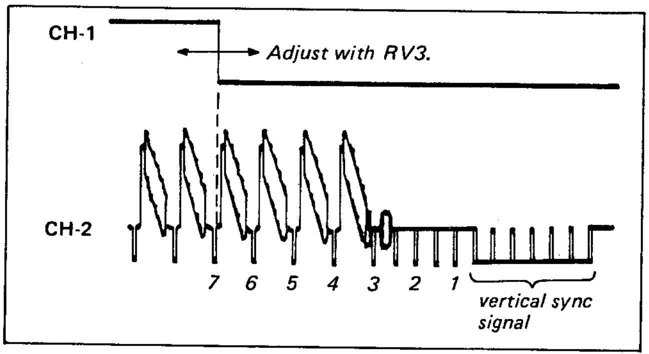


*Fig. 4-3-6. Record-servo lock phase adjustment*

4. Picture Search (High-Speed Picture) (AS-3 board)

   (1) Record a video signal.

   (2) Play back the recorded segment.

   (3) Connect the oscilloscope to pin 10 of IC5 on the YC-6 board.

   (4) Position the positive-going edge of the waveform at the exact center of the oscilloscope scale. (See Fig. 4-3-7.)

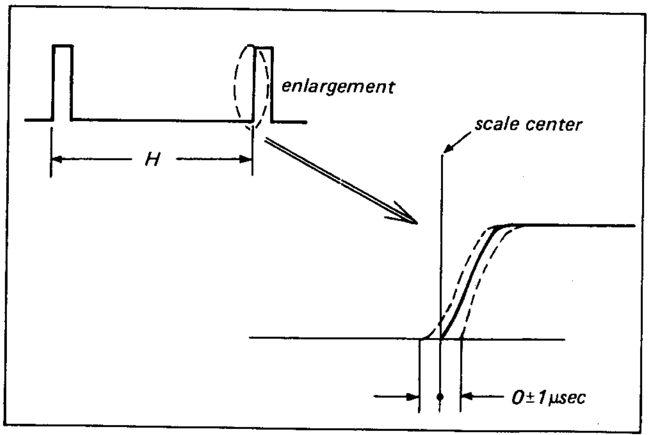


*Fig. 4-3-7. Picture search free speed adjustment*

   (5) Set up the CUE mode.

   (6) Adjust RV11 so that the fluctuation of the rising of the waveform is within 0 ± 1 μsec. for the scale center.

   (7) Set up the REVIEW mode.

   (8) Adjust RV12 so that the fluctuation of the rising of the waveform is within 0 ± 1 μsec. for the scale center.

### 4-3-2. Capstan Servo System Alignment

1. Capstan Free Speed Adjustment (AS-3 board)

   (1) Play back the colour bar segment of the alignment tape.

   (2) Connect the oscilloscope as follows.
   CH-1 . . . . . pin 19 of IC2
   CH-2 . . . . . pin 20 of IC2

   (3) Adjust RV8 for the phase lock shown in Fig. 4-3-8.)

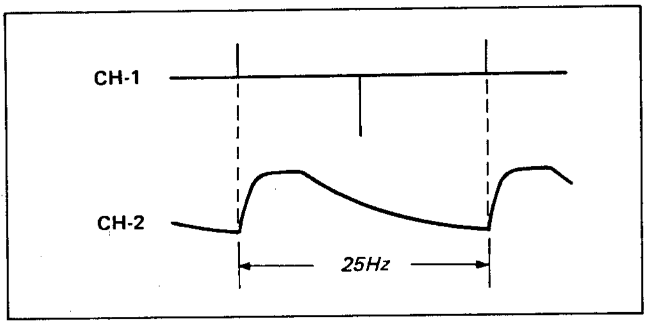


*Fig. 4-3-8. Phase lock*

   (4) Connect the oscilloscope to TP4.
   Input range: DC range

   (5) Adjust RV8 for 5.5 V ± 0.3 V.

   (6) Play back the coulor bar signal in the TRIPLE speed.

   (7) Adjust RV9 for 5.5 V ± 0.3 V.

2. Tracking Control Center Adjustment (AS-3 board)

   (1) Set the TRACKING knob to the center detent position.

   (2) Play back the colour bar signal segment of the alignment tape.

   (3) Connect the oscilloscope as follows.
   CH-1 . . . . . TP11
   CH-2 . . . . . TP6

   (4) Adjust RV4 so that the phases of the falling sections of the waveforms become the same. (See Fig. 4-3-9.)

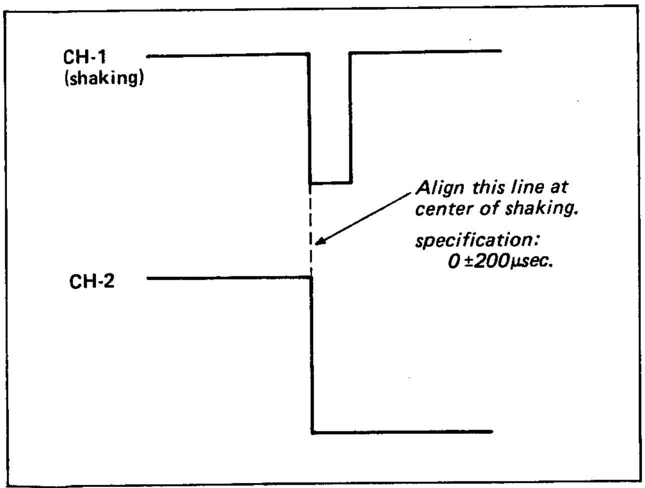


*Fig. 4-3-9. Tracking control center adjustment*

3. Triple Speed Noise Position Adjustment (AS-3 board)

   (1) Record an optional signal.

   (2) Set the TRACKING knob to the center detent position.

   (3) Play back the recorded segment in the TRIPLE speed.

   (4) Adjust RV5 so that the noise disappears from the monitor TV screen. (See Fig. 4-3-10.)

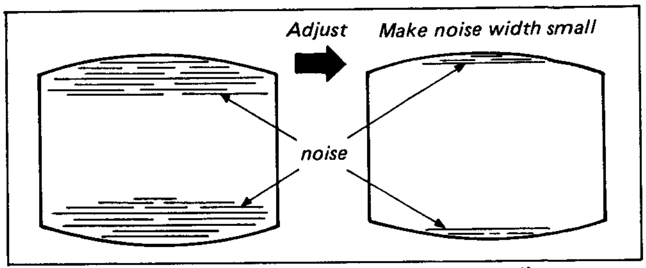


*Fig. 4-3-10. Triple speed noise position adjustment*

### 4-3-3. Automatic Frame-by-Frame Feed Circuit Adjustment

1. Frame-by-Frame Speed Adjustment (AS-3 board)

   (1) Set up the FRAME-by-FRAME mode. (Keep pressing the FRAME button.)

   (2) Connect the oscilloscope to the emitter of Q6.

   (3) Adjust RV6 for a pulse width of 18 msec ± 1 msec. (See Fig. 4-3-11.)

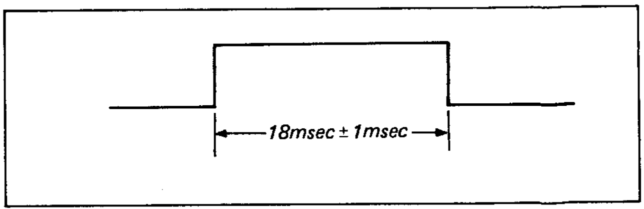


*Fig. 4-3-11. Frame-by-frame speed adjustment*

2. Frame-by-Frame Noise Position Adjustment (AS-3 board)

   (1) Set up the STILL mode.

   (2) Push the FRAME switch once and remember the position where the noise stops.

   (3) Turn RV7 clockwise or counterclockwise a little and push the FRAME switch again. Confirm the position where the noise stops varies.

   (4) Repeat Step (3) and adjust RV7 for minimum noise viewed on the picture. (See Fig. 4-3-12.)

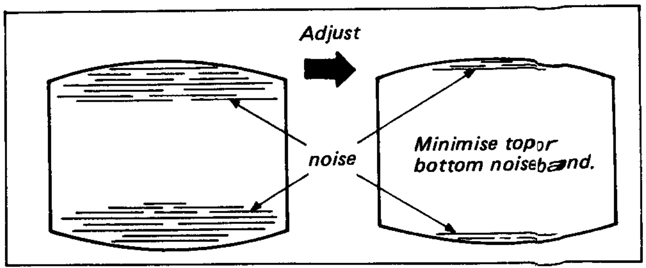


*Fig. 4-3-12. Frame-by-frame noise position adjustment*

## 4-4. VIDEO SYSTEM ALIGNMENT (CR-4, YC-6, and RF-2 boards)

The adjustment sequence for each circuit board is shown below. The colour video signal used for the video system alignment should satisfy the specification shown in the [Setup for Alignment].

**[CR-4 Board]**

1. 1 H Delay Adjustment

(1) Supply the VTR with the colour bar signal and set up the E-E mode.

(2) Connect the vectorscope to pin 8 of IC2.

(3) Adjust the PHASE knob of the vectorscope for matching the burst signal phase. (See Fig. 4-4-1.)

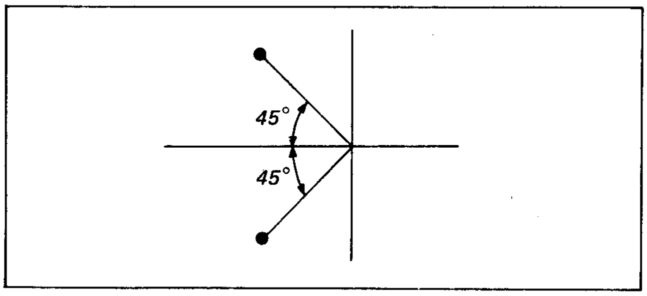


*Fig. 4-4-1. Vectorscope adjustment*

(4) Connect the vectorscope pin 9 of IC2.

(5) Adjust LV1 so that the burst signal phase matches the phase of pin 8 of IC2. (See Fig. 4-4-2.)

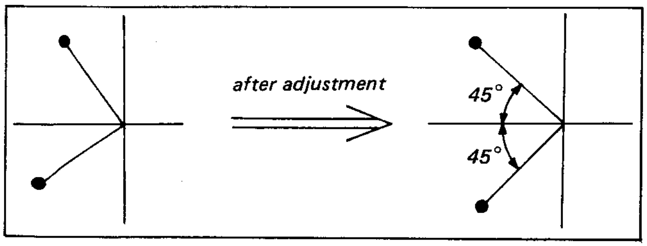


*Fig. 4-4-2. 1 H delay adjustment*

(6) Connect the oscilloscope as follows.

CH-1 . . . . . Pin 8 of IC2
CH-2 . . . . . Pin 9 of IC2

(7) Adjust RV2 so that the signal level of the CH-1 is equal to the one of the CH-2. (See Fig. 4-4-3.)

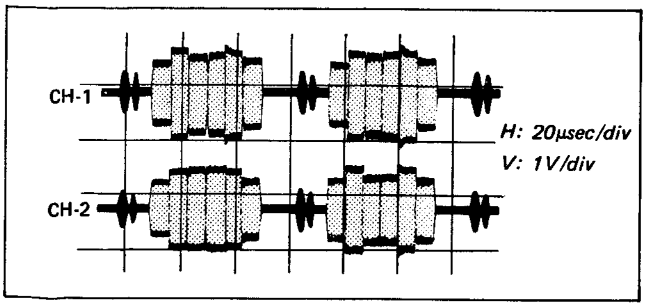


*Fig. 4-4-3. Balance adjustment of chroma signal*

2. Sub-Burst Adjustment

(1) Supply the VTR with the colour bar signal and set up the E-E mode.

(2) Connect the vectorscope to the base of Q21 and adjust the PHASE knob of the vectorscope so that the burst signal comes to the 270° point. (See Fig. 4-4-4.)

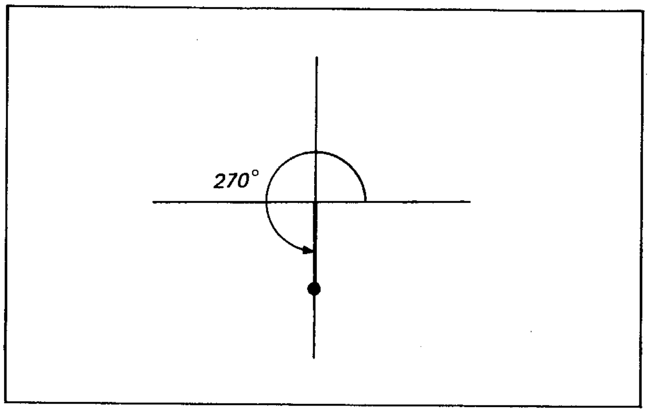


*Fig. 4-4-4. Vectorscope adjustment*

(3) Connect the vectorscope to pin 1 of IC5.

(4) Adjust RV5 so that the advanced phase of the burst signal becomes 225°. (See Fig. 4-4-5.)

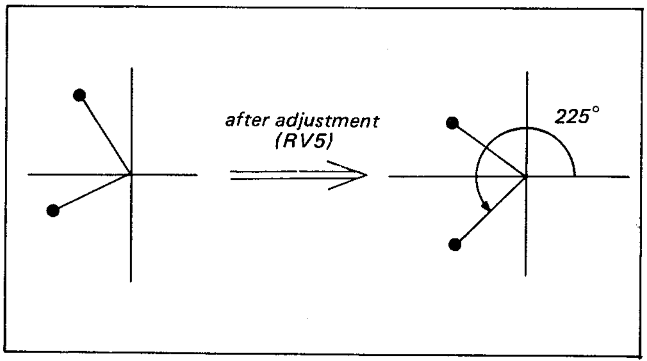


*Fig. 4-4-5. Phase adjustment of sub-burst signal*

(5) Connect the oscilloscope to pin 1 of IC5.

(6) Adjust RV6 so that the average output level is 0.56 V ± 0.02 Vp-p. (See Fig. 4-4-6.)

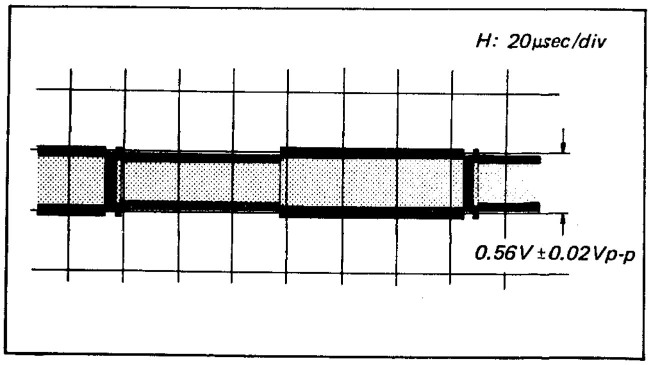


*Fig. 4-4-6. Level adjustment of burst signal*

3. Burst Gate Adjustment

(1) Connect the VTR with the colour bar signal and set up the E-E mode.

(2) Connect the oscilloscope as follows.
CH-1 . . . . . Base of Q4
CH-2 . . . . . Pin 11 of IC2
Mode . . . . CHOP mode

(3) Adjust RV3 so that the pulse width of the burst gate signal is 4.4 μsec ± 0.2 μsec. (See Fig. 4-4-7.)

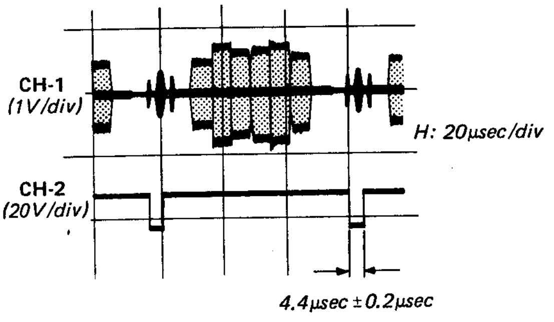

CH-1
(1V/div)
H: 20μsec/div
CH-2
(20V/div)
4.4μsec ± 0.2μsec

*Fig. 4-4-7. Pulse width adjustment of burst gate signal*

4. Chroma Level Adjustment

(1) Supply the VTR with the colour bar signal and set up the E-E mode.

(2) Connect the oscilloscope to TP17 (VIDEO OUT) on the YC-6 board.

(3) Adjust RV4 for the equal levels of the sync signal and the burst signal. (See Fig. 4-4-8.)

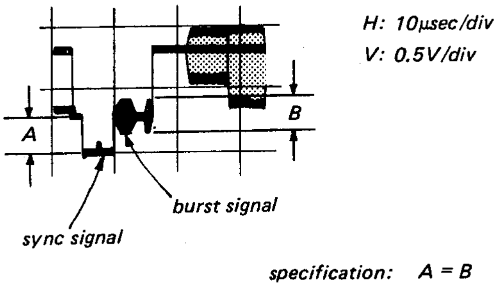

H: 10μsec/div
V: 0.5V/div
A
B
burst signal
sync signal
specification: A = B

*Fig. 4-4-8. Chroma level adjustment*

5. Sub-Burst Adjustment

(1) Record the colour bar signal and play back the recorded segment.

(2) Connect the vectorscope to pin 2 of CN1004 on the YC-6 board.

(3) Write down the phase of the burst signal in the playback. (See Fig. 4-4-9.)

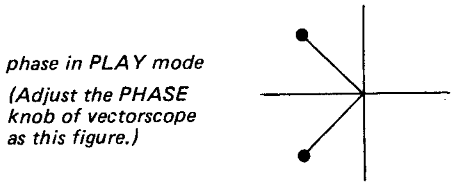

phase in PLAY mode
(Adjust the PHASE knob of vectorscope as this figure.)

*Fig. 4-4-9. Playback phase and sub-burst adjustments*

(4) Set up the STILL mode and adjust RV5 so that the burst signal phase matches the phase in the playback written down in Step (3). (See Fig. 4-4-9.)

(5) Connect the oscilloscope to pin 2 of CN1004 on the YC-6 board.

(6) Adjust RV6 for the sub-burst signal level of 0.27 V ± 0.02 Vp-p. (See Fig. 4-4-10.)

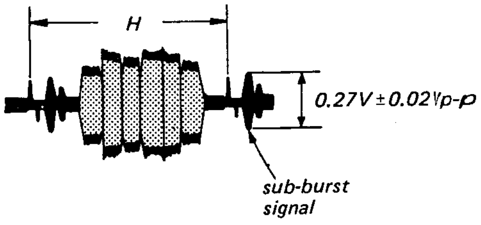

H
0.27V ± 0.02Vp-p
sub-burst signal

*Fig. 4-4-10. Level adjustment of sub-burst signal*

**[YC-6 Board]**

1. SYNC AGC Preset Adjustment

(1) Supply the VTR with the colour bar signal and set up the E-E mode.

(2) Check the following points with the oscilloscope.
IC1 Pin 3 . . . Sync . . . . . . . . . . . . . Approx. 6 Vp-p
Pin 4 . . . Burst flag . . . . . . . . . Approx. 5 Vp-p
Pulse width: Approx. 1 μsec
Pin 5 . . . AGC CONT . . . . . . . . Approx. 1.4 Vdc
Pin 17 . . MONO/COLOUR . . . . Approx. 0 Vdc

(3) Connect the oscilloscope to pin 24 of IC1.

(4) Adjust RV1 for the sync signal level of 300mV ± 12mVp-p. (See Fig. 4-4-11.)

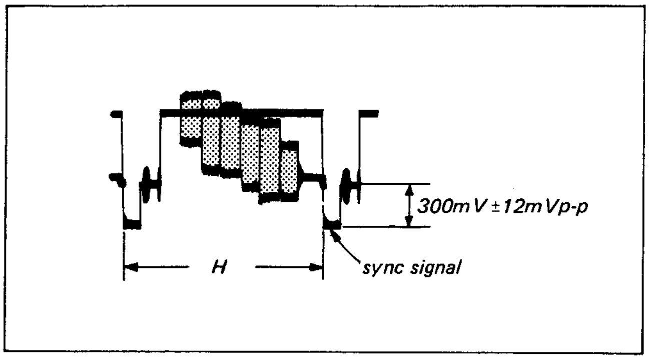

300m V ± 12m Vp-p
H
sync signal

*Fig. 4-4-11. Lebel adjustment of sync signal*

2. Colour E-E Level Adjustment

(1) Supply the colour bar signal and set up the E-E mode.

(2) Connect the oscilloscope to pin 22 of IC1.

(3) Adjust RV14 for the sync signal level of 300 mV ± 15 mVp-p. (See Fig. 4-4-12.)

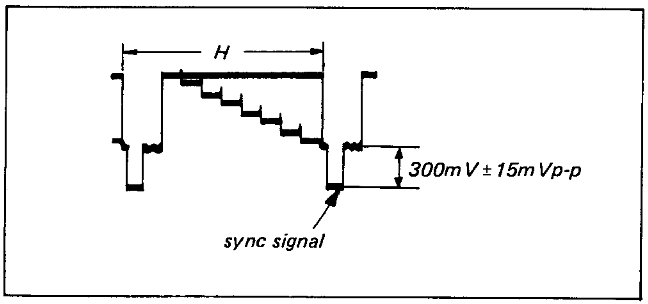

H
300m V ± 15m Vp-p
sync signal

*Fig. 4-4-12. Level adjustment of sync signal*

3. Peak AGC (E-E Video Output Level) Adjustment

(1) Supply the VTR with the colour bar signal and set up the E-E mode.

(2) Connect the oscilloscope to pin 24 of IC1.

(3) Adjust RV1 for maximum output level of the video signal and then adjust RV8 so that the output level of the video signal becomes 1.1 V ± 0.05 Vp-p. (See Fig. 4-4-13.)

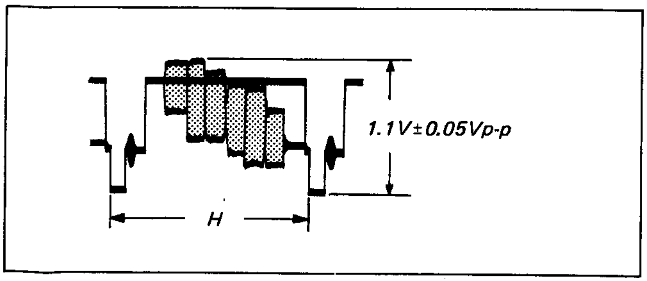

1.1 V ± 0.05 Vp-p
H

*Fig. 4-4-13. Peak AGC adjustment*

4. SYNC AGC Adjustment

(1) Supply the VTR with the colour bar signal and set up the E-E mode.

(2) Connect the oscilloscope to pin 24 of IC1.

**Note:** The voltage at pin 17 of IC1 is approximately 0 Vdc

(3) Adjust RV1 so that the sync signal level is 300 mV ± 12 mVp-p. (See Fig. 4-4-14.)

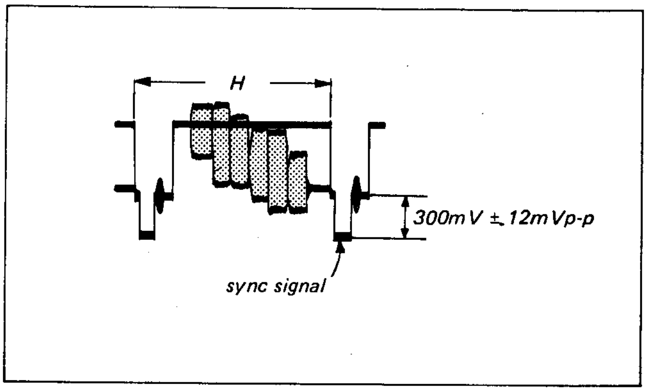

H
300m V ± 12m Vp-p
sync signal

*Fig. 4-4-14. Sync AGC adjustment*

5. Compress Adjustment

(1) Do not supply the VTR with any signal and set up the E-E mode.

(2) Connect the digital voltmeter to the points shown in Fig. 4-4-15.

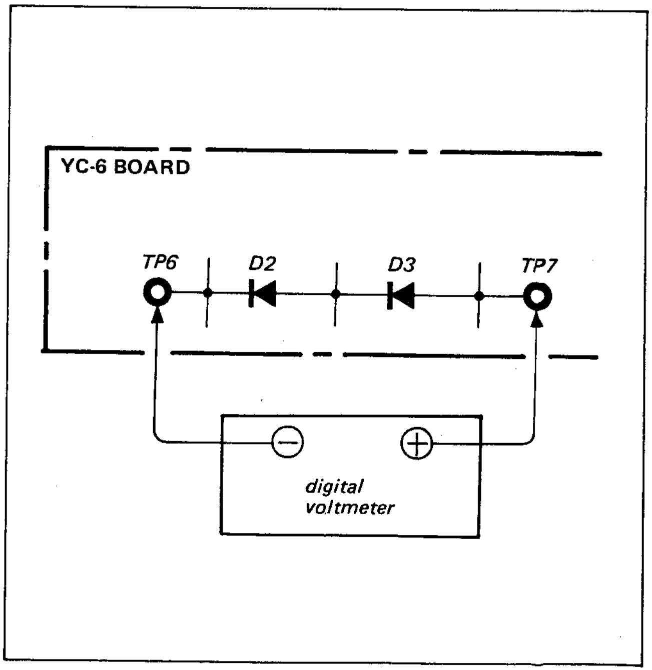

YC-6 BOARD
TP6
D2
D3
TP7
⊖
⊕
digital voltmeter

*Fig. 4-4-15. Measurement points*

(3) Adjust RV4 for 0.454 Vdc.

6. White Clip Adjustment

(1) Supply the VTR with the colour bar signal and set up the E-E mode.

(2) Connect the oscilloscope to TP4 (collector of Q8).

(3) Adjust RV5 so that the signal tip (white peak) is 220% ± 5%. (See Fig. 4-4-16.)

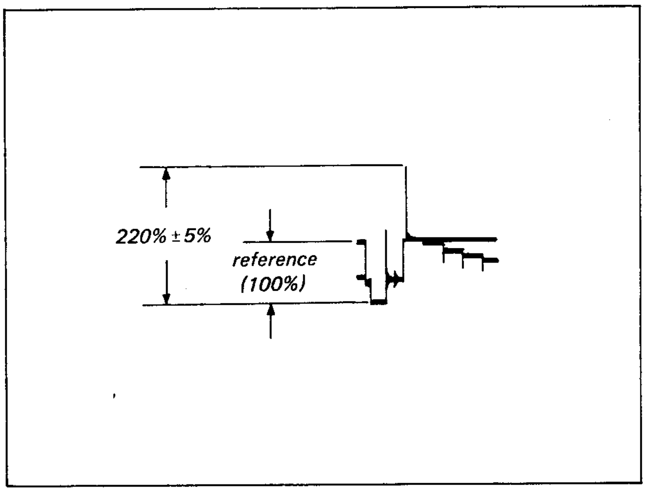


*Fig. 4-4-16. White clip adjustment*

7. Dark Clip Adjustment

(1) Supply the VTR with the colour bar signal and set up the E-E mode.

(2) Connect the oscilloscope to TP4 (collector of Q8).

(3) Adjust RV6 so that the signal tip (dark peak) is 170% ± 5%. (See Fig. 4-4-17.)

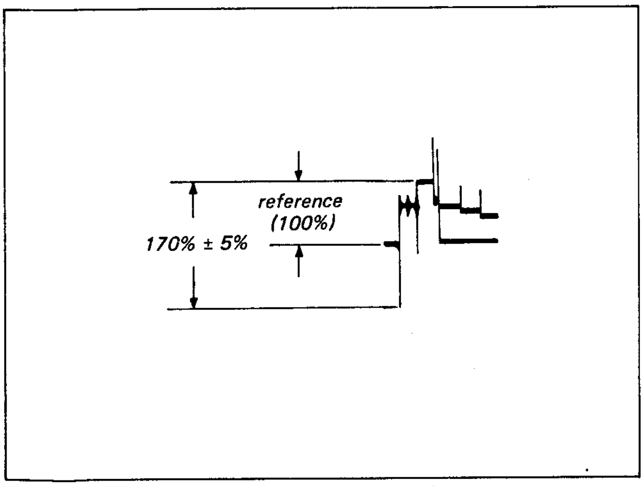


*Fig. 4-4-17. Dark clip adjustment*

8. Expand Adjustment

(1) Do not supply the VTR with any signal and set up the E-E mode.

(2) Connect the digital voltmeter to the points shown in Fig. 4-4-18.

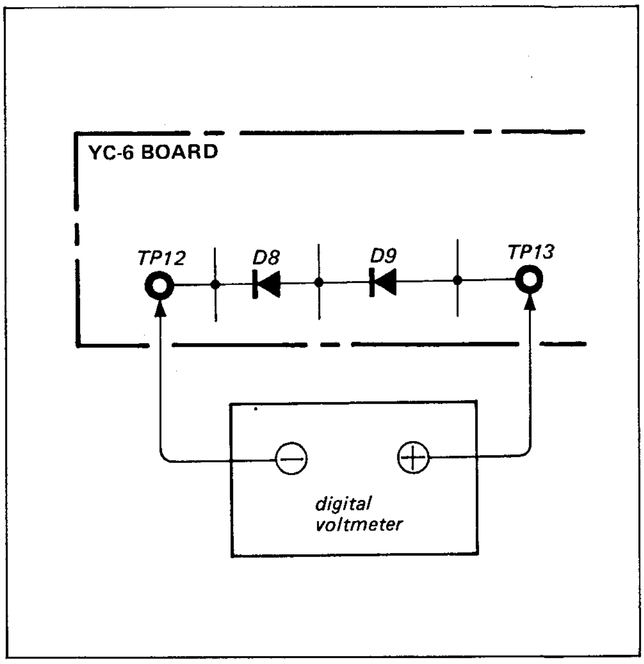


*Fig. 4-4-18. Measurement points*

(3) Adjust RV10 for 0.57 Vdc.

9. AFC Adjustment

(1) Supply the VTR with a video signal and set up the E-E mode.

(2) Connect the oscilloscope to TP19 (pin 4 of IC1, H.Sync).
TRIG: EXT (IC1-4 pin, H.Sync)

(3) Adjust RV21 so that the lock point is the center of the trapezoidal waveform. (See Fig. 4-4-19.)

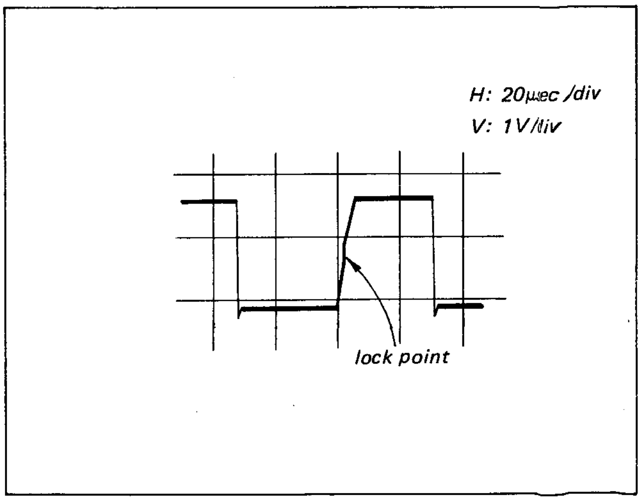


*Fig. 4-4-19. AFC adjustment*

10. AGC Offset Adjustment

(1) Supply the VTR with the video signal and set up the RECORD mode.

(2) Connect the oscilloscope to TP19 (pin 5 of IC6).
TRIG: EXT (TP3, RF SW PULSE, on RF-2 board)

(3) Adjust RV22 so that the lock points of the A-CH and the B-CH are at the points shown in Fig. 4-4-20.

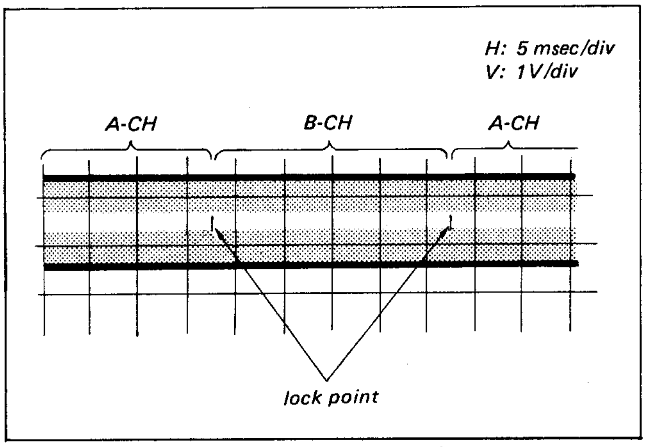


Fig. 4-4-20. AFC offset adjustment

11. Comb Filter Adjustment

(1) Supply the VTR with the colour bar signal and set up the E-E mode.

(2) Check that the chroma signal level at TP22 (pin 8 of IC2) is approximately 1.5 Vp-p. (See Fig. 4-4-21.)

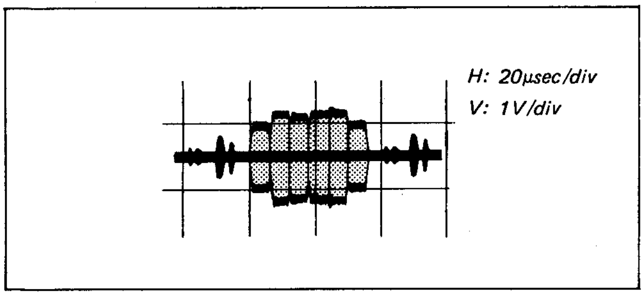


Fig. 4-4-21. Level check of chroma signal

(3) Connect the oscilloscope to TP21 (junction of R191 and R192).

(4) Adjust LV1 and RV19 alternately for minimum level of the chroma signal. (See Fig. 4-4-22.)

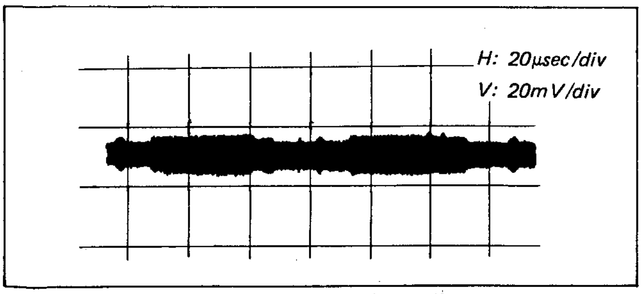


Fig. 4-4-22. Comb filter adjustment

(5) Check that the difference in the signal levels at TP21 and TP22 is more than 26 dB after the adjustment.

12. ACC Adjustment

(1) Supply the VTR with the colour bar signal and set up the E-E mode.

(2) Connect the oscilloscope to TP22 (pin 8 of IC2).

(3) Adjust T5 for minimum output level.

(4) Adjust RV16 for 1.5 V ± 0.1 Vp-p. (See Fig. 4-4-23.)

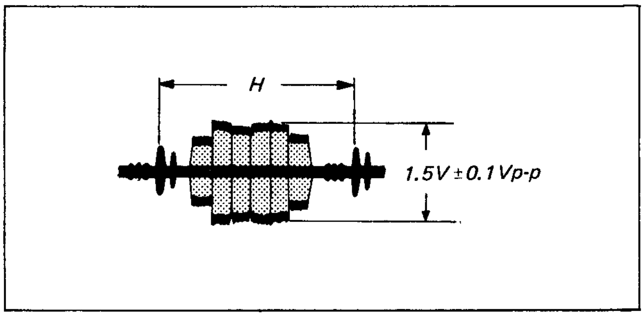


Fig. 4-4-23. ACC adjustment

13. X'tal Oscillation Adjustment

(1) Set up the PLAY mode.

(2) Connect the frequency counter to TP24 (emitter of Q57).

(3) Adjust T7 for an oscillating frequency of 4.433619 MHz.

(4) Check that the output level is 0.5 V ± 0.05 Vp-p. (See Fig. 4-4-24.)

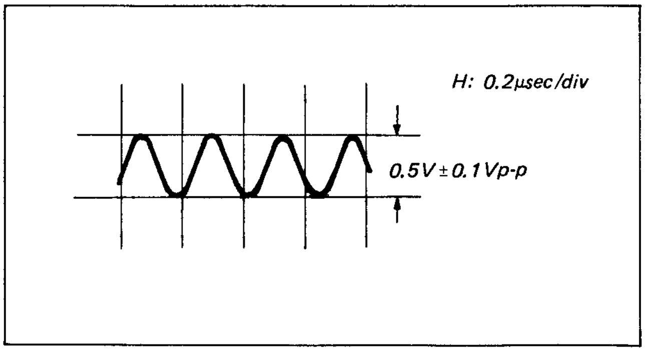


Fig. 4-4-24. Output level check

14. VXO Oscillating Frequency Adjustment

(1) Do not supply the VTR with any signal and set up the E-E mode.

(2) Connect the frequency counter to TP24 (emitter of Q57).

(3) Adjust T8 so that the oscillating frequency is 4.433619 MHz ± 5 Hz.

(4) Check that the output level is 0.7 V ± 0.2 Vp-p. (See Fig. 4-4-25.)

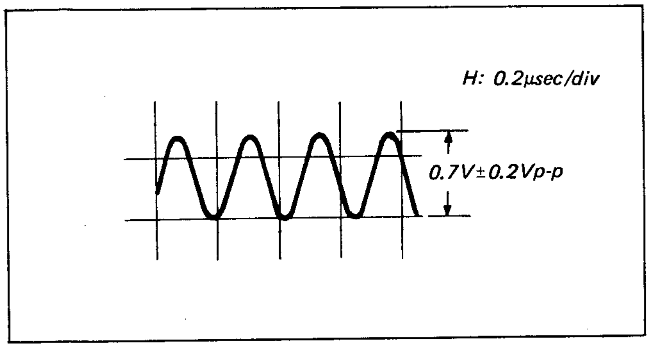


*Fig. 4-4-25. Output level check*

15. Pilot Burst Adjustment

(1) Supply the VTR with the colour bar signal and set up the E-E mode.

(2) Connect the oscilloscope to TP26 (emitter of Q56).

(3) Adjust RV18 so that the level of the chroma signal becomes equal to the one of the burst signal. (See Fig. 4-4-26.)

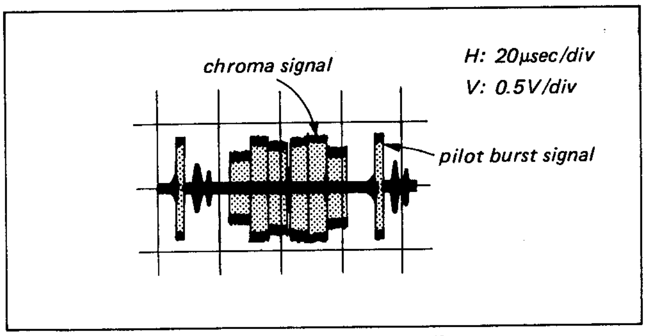


*Fig. 4-4-26. Pilot burst adjustment*

16. Chroma Record Current Adjustment

(1) Supply the VTR with the colour bar signal and set up the E-E mode.

(2) Connect the oscilloscope to TP26 (emitter of Q56).

(3) Adjust RV20 for a chroma signal level of 0.35 V ± 0.05 Vp-p. (See Fig. 4-4-27.)

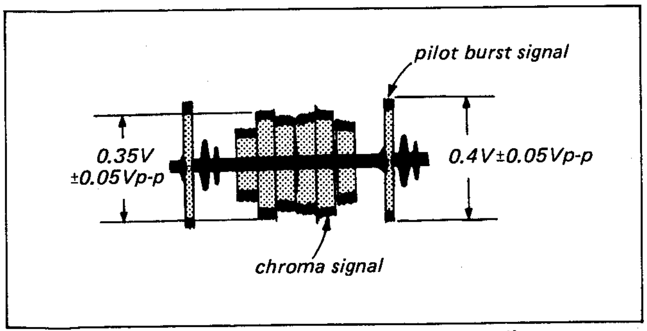


*Fig. 4-4-27. Chroma record current adjustment*

(4) Check that the level of the pilot burst signal is 0.4 V ± 0.05 Vp-p. If not, adjust RV18. (See Fig. 4-4-27.)

17. Test Signal Frequency Adjustment

**[Adjustment with Frequency Counter]**

(1) Turn on the TEST SIG switch.

(2) Connect the frequency counter to TP27 (emitter of Q78).

(3) Adjust RV24 for 15.625 kHz ± 100 Hz.

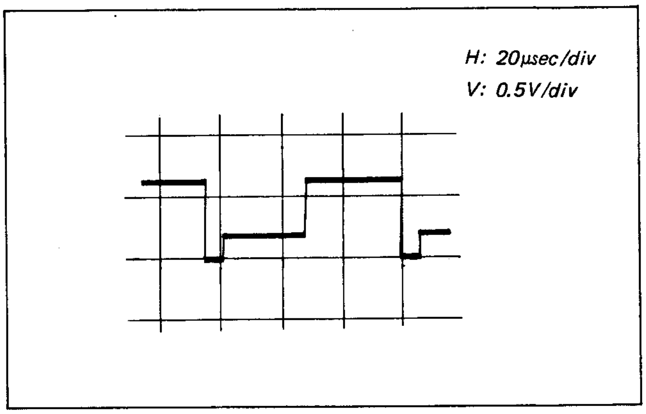


*Fig. 4-4-28. Output waveform*

**[Adjustment by Observing Monitor TV]**

(1) Turn on the TEST SIG switch.

(2) Adjust RV24 so that the monitor TV picture becomes as shown in Fig. 4-4-29.

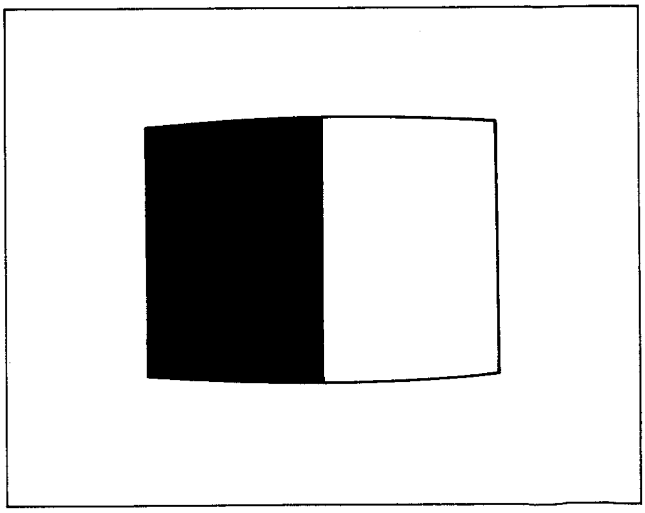


*Fig. 4-4-29. Test signal adjustment*

**[RF-2 Board]**

1. Record Current Frequency Characteristic Adjustment

(1) Set up the no-signal input state and set up the RECORD mode.

(2) Connect the oscilloscope to TP1 and the GND probe to TP2.

**Note:** Since TP2 is the REG 12 V line, do not connect the GND probe to the points other than TP2.

(3) Adjust RV6 for a signal level of 130 mVp-p. (See Fig. 4-4-30.)

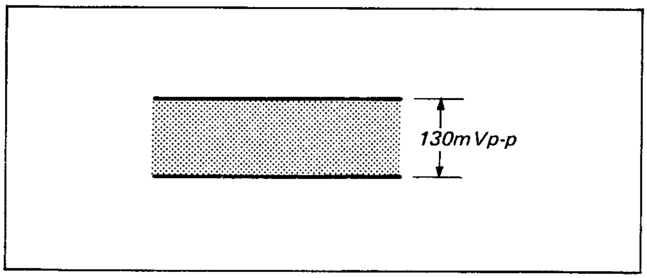


*Fig. 4-4-30. Record current frequency characteristic adjustment*

2. Playback Amplifier Frequency Characteristic Adjustment

(1) Play back the RF sweep signal segment of the alignment tape.

(2) Connect the oscilloscope to TP5.
TRIG: EXT (TP3, RF SW PULSE)
TRIG SLOPE { + ... CH-B
− ... CH-A

(3) Adjust the TRACKING knob for maximum signal level.

(4) Make the signal level from 1 MHz to 5.2 MHz flat.

A-CH . . . . . RV1
B-CH . . . . . RV2

(See Fig. 4-4-31.)

(5) Adjust RV3 so that the signal levels between 1 MHz and 2 MHz are all the same in the A-CH and B-CH.

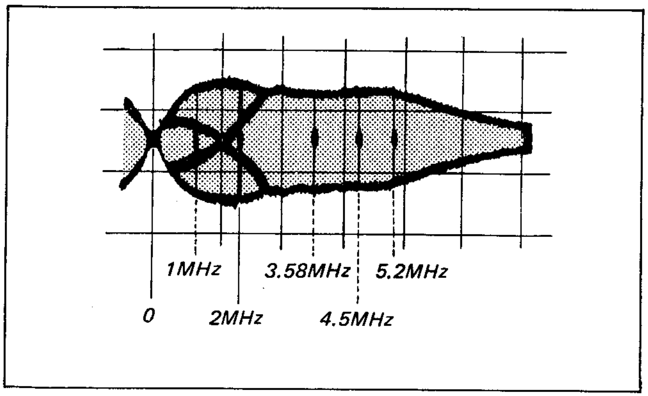


*Fig. 4-4-31. Playback amplifier frequency characteristic adjustment*

3. Dropout Compensation Adjustment

(1) Play back a blank tape.

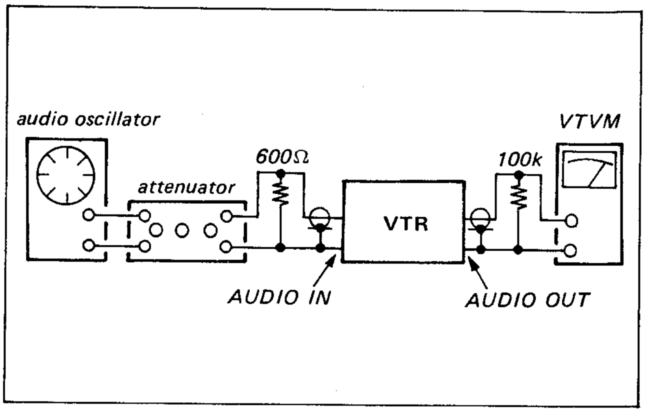
(2) Connect the oscilloscope to pin 2 of IC1.
INPUT: DC range

(3) Set RV4 to the point where the voltage at pin 2 of IC1 changes to 0.6 Vdc from 0 Vdc.

(4) Play back a recorded tape which has dropouts and check that the dropouts are compensated.

## 4-5. AUDIO SYSTEM ALIGNMENT (AS-3 Board)

**[Connection of Relative Equipment]**



**[Adjustment Sequence]**

1. Audio Head Adjustment
2. Playback Frequency Characteristic Adjustment
3. Playback Output Level Adjustment
4. Bias Oscillator Check
5. Bias Trap Adjustment
6. Record Bias Adjustment
7. Record Level Adjustment
8. Audio Dubbing Bias Adjustment
9. Overall Frequency Characteristic Check
10. Overall S/N Ratio Check
11. Overall Distortion Check

1. Audio Head Adjustment (Refer to the SECTION 3-19)

2. Playback Frequency Characteristic Adjustment

(1) Play back the 333 Hz and 5 kHz segments of the alignment tape.

(2) Adjust RV404 so that the output level difference between 333 Hz and 5 kHz is within +1.5 ± 1 dB.

3. Playback Output Level Adjustment

(1) Play back the 333 Hz segment of the alignment tape.

(2) Adjust RV403 so that the output level is within −25 ± 1 dB.

4. Bias Oscillator Check

(1) Insert the cassette and set up the RECORD mode.

(2) Connect a pickup coil (approx. 33mH) to the frequency counter and move the counter to T401 (in the shield case).

(3) Check that the oscillating frequency is 65 kHz ± 6.5 kHz.

5. Bias Trap Adjustment
   (1) Set the input signal level to zero. (Set the audio oscillator output to zero and the attenuator to maximum.)
   (2) Connect the oscilloscope to the collector of Q406.
   (3) Adjust LV401 for minimum bias leak.
   Value: minimum level below 1 Vp-p.

6. Record Bias Adjustment

   Check that the playback frequency characteristic adjustment has been completed.

   (1) Connect TP402 and TP403 (GND) with a jumper so as to turn off the AGC operation.
   (2) Set the oscillator frequency to 333 Hz and adjust the AUDIO OUT terminal level with the attenuator for −25 dB.
   (3) Record the signal.
   (4) Change the audio signal to 7 kHz at −25 dB.
   (5) Record the signal.
   (6) Play back the recorded signals.
   (7) Ensure that the output level of 7 kHz is within ±1 dB against the one of 333 Hz.
   (8) If not, adjust RV402 and repeat Steps (2) through (7) until the specification is satisfied.
   (9) Remove the jumper connected to TP402.

7. Record Level Adjustment
   (1) Connect TP402 and TP403 (GND) with a jumper so as to turn off the AGC operation.
   (2) Set the oscillator frequency to 333 Hz and adjust the AUDIO OUT terminal level with the attenuator for −5 dB.
   (3) Record the signal.
   (4) Play back the recorded signal.
   (5) Ensure that the output level is within −5 ± 1 dB.
   (6) If not, adjust RV401 and repeat Steps (2) through (5) until the specification is satisfied.
   (7) Remove the jumper connected to TP402.

8. Audio Dubbing Bias Adjustment
   (1) Connect TP402 and TP403 (GND) with a jumper so as to turn off the AGC operation.
   (2) Set the oscillator frequency to 333 Hz and adjust the AUDIO OUT terminal level with the attenuator for −25 dB.
   (3) Set up the AUDIO DUB mode.
   (4) Change the oscillator signal to 7 kHz, −25 dB and set up the AUDIO DUB mode.
   (5) Play back the signals.
   (6) Ensure that the output level of 7 kHz is 0 ± 1 dB against the one of 333 Hz.
   (7) If not, adjust LV402 and repeat Steps (2) through (6) until the specification is satisfied.
   (8) Remove the jumper connected to TP402.

9. Overall Frequency Characteristic Check
   (1) Set the oscillator frequency to 333 Hz and adjust the AUDIO terminal level with the attenuator for −25 dB.
   (2) Record the signal.
   (3) Change the oscillator signal to 50 Hz, 100 Hz, 3 kHz, 5 kHz, 7 kHz and 10 kHz.
   (4) Record the signals.
   (5) Play back the recorded signals.
   (6) Ensure that the output levels are within the specified values. (See Fig. 4-5-1.)

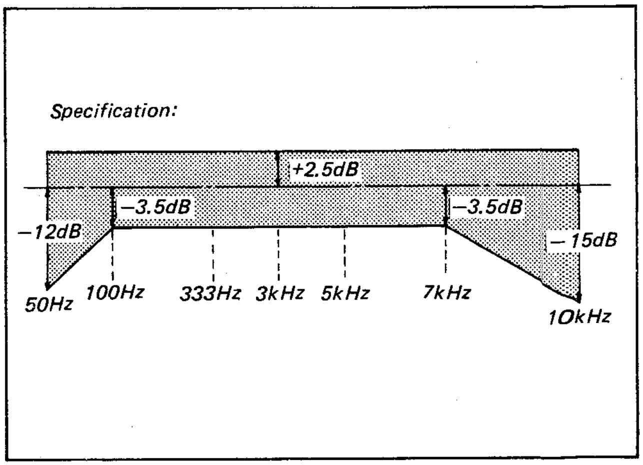


*Fig. 4-5-1. Overall frequency caracteristic check*

10. Overall S/N Ratio Check
    (1) Terminate the AUDIO IN terminal.
    (no signal input)
    (2) Insert the cassette and set up the record mode.
    (3) Open the AUDIO IN terminal and supply the 333 Hz at −10 dB signal to AUDIO IN terminal.
    (4) Record the signal
    (5) Play back the two segments.
    (6) Ensure that the output level difference between two segments is more than 40 dB.

11. Overall Distortion Check
    (1) Set the oscillator frequency to 400 Hz and adjust the AUDIO OUT terminal level with the attenuator for −10 dB.
    (2) Record the signal.
    (3) Connect the distortion meter to the AUDIO OUT terminal.
    (4) Play back the recorded signal and ensure that the distorition is less than 4%.

## 4-6. TUNER BLOCK SYSTEM ALIGNMENT

1. +60 V Adjustment & −30 V Check (TU-11 board)
    - (1) Receive the E-12CH telecast signal.
    - (2) Connect the digital voltmeter to pin 3 of CN8105.
    - (3) Adjust RV101 for 60 V ± 0.3 V.
    - (4) Check that the voltage at pin 1 of CN8105 is within −25 V to −31 V.

## 4-7. TIMER SYSTEM ALIGNMENT (TM-10 Board)

1. Oscillating Frequency Adjustment
    - (1) Connect the frequency counter to TP2 (pin 1 of IC6).
    - (2) Adjust CV1 for 60 Hz.
      Specification: within 60 Hz ± 0.5 Hz/day

Betamax

VIDEOCASSETTE RECORDER

# SL-C7E

No. 3
May, 1980

# SUPPLEMENT

## Subject; Tuner Block Modification

This supplement includes production changes starting with Serial No. 220001.
File this supplement with the service manual.

### 1. INTRODUCTION

The CH-3 board has been changed into the CH-7 board.

### 2. INTERCHANGEABILITY

The former and new circuit boards are not interchangeable.

### 3. CHANGED PARTS LIST

All tuner block electrical parts list is shown on next page and later.

SONY®
SERVICE MANUAL

## 2. TUNER BLOCK (CH-7, CI-1, IF-10, PC-1, TU-11 BOARD) ELECTRICAL PARTS LIST

### CH-7 BOARD

| *Ref. No.* | *Part No.* | *Description* | | *Remark* |
|---|---|---|---|---|
| ♠ | A-6725-175-A | CH-7 Board, complete | | |
| C1 | 1-131-347-00 | 1 | 35V | tantalum |
| C2 | 1-108-251-00 | 0.1 | | mylar |
| C3 | 1-161-323-00 | 0.001 | | |
| C4, 5 | 1-161-319-00 | 470p | | |
| C6 | 1-108-365-00 | 0.001 | 100V | mylar |
| C8 | 1-161-021-00 | 0.047 | | |
| C9 | 1-161-271-00 | 100p | | |
| C10 | 1-123-319-00 | 47 | 16V | elect |
| C11, 12 | 1-123-316-00 | 10 | 16V | elect |
| C14 | 1-161-323-00 | 0.001 | | |
| C15 | 1-123-352-00 | 1 | 50V | elect |
| C16 | 1-131-345-00 | 0.47 | 35V | tantalum |
| C17 | 1-161-021-00 | 0.047 | | |
| C18 | 1-123-352-00 | 1 | 50V | elect |
| C19 | 1-161-013-00 | 0.01 | | |
| C20 | 1-161-271-00 | 100p | | |
| C21 | 1-161-263-00 | 22p | | |
| C22 | 1-161-271-00 | 100p | | |
| C23 | 1-108-820-00 | 0.22 | | mylar |
| C24 | 1-161-265-00 | 33p | | |
| C25 | 1-123-228-00 | 1 | 50V | elect |
| C26, 27 | 1-161-223-00 | 0.022 | | |
| C28 | 1-123-353-00 | 2.2 | 50V | elect |
| C29 | 1-161-013-00 | 0.01 | | |
| C30 | 1-131-349-00 | 2.2 | 35V | tantalum |
| C31 | 1-161-323-00 | 0.001 | | |
| C32 | 1-123-228-00 | 1 | 50V | elect |
| C33 | 1-131-345-00 | 0.47 | 35V | tantalum |
| C40 | 1-102-125-00 | 0.0047 | | |
| ♠CN2 | 1-508-735-21 | 5P connector | | |
| ♠CN3 | 1-508-736-00 | 10P connector | | |
| ♠CN4 | 1-508-847-00 | 4P connector | | |
| ♠CN5 | 1-508-848-00 | 6P connector | | |
| ♠CN6 | 1-508-735-00 | 5P connector | | |
| ♠CN7 | 1-508-847-00 | 4P connector | | |
| ♠CN8 | 1-508-734-00 | 3P connector | | |
| ♠CN9 | 1-508-849-00 | 8P connector | | |
| D2–5 | 8-719-815-55 | 1S1555 | | |
| D7–10 | 8-719-815-55 | 1S1555 | | |
| ⇒D11–15 | 8-719-311-23 | SEL1122P-N | | |
| D16 | 8-719-812-31 | TLR123 | | |
| D17 | 8-719-812-32 | TLY123 | | |
| D18 | 8-719-812-33 | TLG123 | | |
| D19 | 8-719-812-31 | TLR123 | | |
| IC1 | 8-758-040-01 | CX804 | | |
| IC2 | 8-759-040-46 | MC14046BCP | | |
| IC3 | 8-757-611-00 | CX761A | | |
| IC4 | 8-757-600-00 | CX760 | | |
| IC5 | 8-759-108-05 | μPC78L05A | | |
| IC6 | 8-759-240-12 | TC4012BP | | |
| IC7, 8 | 8-759-240-11 | TC4011BP | | |
| IC9 | 8-759-965-60 | BA656 | | |
| IC10 | 8-759-240-11 | TC4011BP | | |
| IC11 | 8-759-240-12 | TC4012BP | | |
| IC12 | 8-759-157-40 | μPC574J | | |
| L1 | 1-407-184-XX | 3.3μH | | |
| Q1 | 8-729-902-11 | 2SC2021 | | |
| Q2 | 8-729-993-72 | 2SA937 | | |
| Q4 | 8-729-902-11 | 2SC2021 | | |
| Q5 | 8-729-139-04 | 2N3904 | | |
| Q6 | 8-724-375-01 | 2SC403C | | |
| Q7–10 | 8-729-993-72 | 2SA937 | | |
| R6 | 1-202-463-00 | 2.2M | 1/4W | conposition |
| ⚠R73, 74 | 1-213-155-00 | 10k | 1W | metal oxide<br>(nonflammable) |
| RV1 | 1-224-251-XX | 4.7k, adjustable | | |
| S1–5 | 1-552-174-00 | Push button | | |
| S6, 7 | 1-516-226-00 | Slide | | |

## CI-1 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ♠ | 1-601-831-00 | CI-1 Board | |
| ♠CN10 | 1-508-849-00 | 8P connector | |
| D20 | 8-719-803-26 | TLR326 | |
| IC13 | 8-759-997-64 | SN29764N | |
| S10–21 | 1-552-412-00 | Keyboard | |

## IF-10 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ♠ | A-6721-051-A | IF-10 Board, complete | |
| C501, 502 | 1-161-047-00 | 0.0047 | |
| C503 | 1-161-272-00 | 120p | |
| C504–509 | 1-161-047-00 | 0.0047 | |
| C510 | 1-123-355-00 | 4.7 50V | elect |
| C511 | 1-123-316-00 | 10 16V | elect |
| C512 | 1-161-047-00 | 0.0047 | |
| C513 | 1-161-280-00 | 12p | |
| C514 | 1-102-529-00 | 100p | |
| C515 | 1-161-323-00 | 0.001 | |
| C516 | 1-123-321-00 | 220 16V | elect |
| C517 | 1-101-006-00 | 0.047 | |
| C518 | 1-103-725-00 | 0.001 | styrol |
| C519 | 1-161-051-00 | 0.01 | |
| C520, 521 | 1-101-006-00 | 0.047 | |
| C523 | 1-108-385-00 | 0.047 100V | mylar |
| C524–526 | 1-161-047-00 | 0.047 | |
| C527 | 1-102-852-00 | 47p | |
| C528 | 1-102-525-00 | 68p | |
| C529 | 1-161-249-00 | 1.5p | |
| C530 | 1-161-259-00 | 10p | |

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| C531–534 | 1-161-047-00 | 0.047 | |
| C535 | 1-123-320-00 | 100 16V | elect |
| C536 | 1-161-267-00 | 47p | |
| C537 | 1-123-323-00 | 470 16V | elect |
| CF501 | 1-404-134-00 | Trap, ceramic | |
| CF502 | 1-527-263-00 | Ceramic, Filter | |
| ♠CN501 | 1-508-743-00 | 5P connector | |
| ♠CN503 | 1-508-797-00 | 4P connector | |
| IC501 | 8-759-014-40 | TBA1440G | |
| IC502 | 8-759-651-35 | M5135P | |
| IC503 | 8-759-001-20 | TBA120UB | |
| L501 | 1-404-221-00 | Coil, IF | |
| L502 | 1-407-184-XX | 3.3μH | |
| L503 | 1-407-159-XX | 15μH | |
| L504 | 1-407-157-XX | 10μH | |
| L505 | 1-407-184-XX | 3.3μH | |
| Q501 | 8-765-300-00 | 2SC2009 | |
| ⇒Q502, 503 | 8-729-663-47 | 2SC1364 | |
| ⚠R517 | 1-247-005-00 | 100 1/4W | carbon (nonflammable) |
| RV501 | 1-224-645-XX | 10k, adjustable | |
| RV502 | 1-224-644-XX | 4.7k, adjustable | |
| SF501 | 1-404-208-00 | Filter, surface wave | |

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| T501 | 1-404-206-00 | IFT | |
| T502 | 1-404-207-00 | VIF | |
| T503 | 1-404-203-00 | VIF | |
| T504 | 1-403-810-00 | AFT Discri (Pri) | |
| T505 | 1-403-811-00 | AFT Discri (Sec) | |
| T506 | 1-404-135-00 | SIF Discri | |
| T507 | 1-404-097-00 | SIFT | |

## PC-1 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ♠ | A-6723-132-A | PC-1 Board, complete | |
| C1 | 1-123-316-00 | 10 16V | elect |
| C2 | 1-102-074-00 | 0.001 | |
| C3 | 1-123-316-00 | 10 16V | elect |
| ♠CN501 | 1-508-743-00 | 5P connector | |
| ♠CN502 | 1-508-797-00 | 4P connector | |
| D1 | 8-719-162-26 | RD6.2E-B3Z | |
| Q1, 2 | 8-729-663-47 | 2SC1364 | |
| Q10 | 8-729-663-47 | 2SC1364 | |
| Q11 | 8-760-523-10 | 2SA772 | |
| Q12, 13 | 8-729-663-47 | 2SC1364 | |
| RV1 | 1-224-643-XX | 2.2k, adjustable | |

## TU-11 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ♠ | A-6721-050-A | TU-11 Board, complete | |
| C101 | 1-123-330-00 | 22 25V | elect |
| C102 | 1-123-328-00 | 4.7 25V | elect |
| C103 | 1-123-316-00 | 10 16V | elect |
| C104 | 1-123-318-00 | 33 16V | elect |
| C105 | 1-102-884-00 | 33p | |
| C106 | 1-102-863-00 | 82p | |
| C107 | 1-102-884-00 | 33p | |
| C108 | 1-102-889-00 | 39p | |
| C109 | 1-102-125-00 | 0.0047 | |
| C110 | 1-102-963-00 | 33p | |
| C111 | 1-102-125-00 | 0.0047 | |
| C112 | 1-102-953-00 | 18p | |
| C113 | 1-102-676-00 | 68p | |
| C114 | 1-121-419-00 | 220 6.3V | elect |
| C115 | 1-121-806-00 | 10 16V | elect (nonpolarized) |
| C116 | 1-123-319-00 | 47 16V | elect |
| C117 | 1-123-352-00 | 1 50V | elect |
| C118 | 1-108-591-00 | 0.033 | mylar |
| C119 | 1-108-367-00 | 0.0015 100V | mylar |
| C120 | 1-123-320-00 | 100 16V | elect |
| C121 | 1-123-319-00 | 47 16V | elect |
| C122, 123 | 1-123-351-00 | 0.47 50V | elect |
| C124 | 1-102-973-00 | 100p | |
| C125 | 1-123-359-00 | 47 50V | elect |
| C126 | 1-123-383-00 | 4.7 100V | elect |
| C127 | 1-108-638-00 | 0.1 100V | mylar |
| C128 | 1-102-125-00 | 0.0047 | |
| C129 | 1-123-320-00 | 100 16V | elect |
| C132 | 1-108-812-00 | 0.047 | mylar |
| C133 | 1-108-249-00 | 0.068 | mylar |
| C134 | 1-161-265-00 | 33p | |
| C136 | 1-123-319-00 | 47 16V | elect |
| ♠CN101 | 1-508-797-00 | 4P connector | |
| ♠CN102 | 1-508-743-00 | 5P connector | |
| ♠CN103 | 1-508-910-00 | 12P connector | |
| ♠CN104 | 1-508-743-00 | 5P connector | |
| ♠CN105 | 1-508-845-00 | 6P connector | |
| ♠CN107 | 1-508-742-00 | 3P connector | |
| ♠CN108 | 1-508-845-00 | 6P connector | |

| *Ref. N* |
|---|
| ⇒D101, 1 |
| ⇒D103 |
| D104 |
| L101 |
| L102, 1 |
| L104 |
| L105 |
| L106 |
| Q101 |
| Q102 |
| ⇒Q103 |
| Q104 |
| ⇒Q106 |
| ⚠R126 |
| RV101 |
| T101 |
| T102 |
| ⚠TU101 |
| ⚠TU102 |
| ⚠ |
| ⚠ |

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| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| T501 | 1-404-206-00 | IFT | |
| T502 | 1-404-207-00 | VIF | |
| T503 | 1-404-203-00 | VIF | |
| T504 | 1-403-810-00 | AFT Discri (Pri) | |
| T505 | 1-403-811-00 | AFT Discri (Sec) | |
| T506 | 1-404-135-00 | SIF Discri | |
| T507 | 1-404-097-00 | SIFT | |

## PC-1 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ● | A-6723-132-A | PC-1 Board, complete | |
| C1 | 1-123-316-00 | 10 16V elect | |
| C2 | 1-102-074-00 | 0.001 | |
| C3 | 1-123-316-00 | 10 16V elect | |
| ●CN501 | 1-508-743-00 | 5P connector | |
| ●CN502 | 1-508-797-00 | 4P connector | |
| D1 | 8-719-162-26 | RD6.2E-B3Z | |
| Q1, 2 | 8-729-663-47 | 2SC1364 | |
| Q10 | 8-729-663-47 | 2SC1364 | |
| Q11 | 8-760-523-10 | 2SA772 | |
| Q12, 13 | 8-729-663-47 | 2SC1364 | |
| RV1 | 1-224-643-XX | 2.2k, adjustable | |

## TU-11 BOARD

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ● | A-6721-050-A | TU-11 Board, complete | |
| C101 | 1-123-330-00 | 22 25V elect | |
| C102 | 1-123-328-00 | 4.7 25V elect | |
| C103 | 1-123-316-00 | 10 16V elect | |
| C104 | 1-123-318-00 | 33 16V elect | |
| C105 | 1-102-884-00 | 33p | |
| C106 | 1-102-863-00 | 82p | |
| C107 | 1-102-884-00 | 33p | |
| C108 | 1-102-889-00 | 39p | |
| C109 | 1-102-125-00 | 0.0047 | |
| C110 | 1-102-963-00 | 33p | |
| C111 | 1-102-125-00 | 0.0047 | |
| C112 | 1-102-953-00 | 18p | |
| C113 | 1-102-676-00 | 68p | |
| C114 | 1-121-419-00 | 220 6.3V elect | |
| C115 | 1-121-806-00 | 10 16V elect (nonpolarized) | |
| C116 | 1-123-319-00 | 47 16V elect | |
| C117 | 1-123-352-00 | 1 50V elect | |
| C118 | 1-108-591-00 | 0.033 mylar | |
| C119 | 1-108-367-00 | 0.0015 100V mylar | |
| C120 | 1-123-320-00 | 100 16V elect | |
| C121 | 1-123-319-00 | 47 16V elect | |
| C122, 123 | 1-123-351-00 | 0.47 50V elect | |
| C124 | 1-102-973-00 | 100p | |
| C125 | 1-123-359-00 | 47 50V elect | |
| C126 | 1-123-383-00 | 4.7 100V elect | |
| C127 | 1-108-638-00 | 0.1 100V mylar | |
| C128 | 1-102-125-00 | 0.0047 | |
| C129 | 1-123-320-00 | 100 16V elect | |
| C132 | 1-108-812-00 | 0.047 mylar | |
| C133 | 1-108-249-00 | 0.068 mylar | |
| C134 | 1-161-265-00 | 33p | |
| C136 | 1-123-319-00 | 47 16V elect | |
| ●CN101 | 1-508-797-00 | 4P connector | |
| ●CN102 | 1-508-743-00 | 5P connector | |
| ●CN103 | 1-508-910-00 | 12P connector | |
| ●CN104 | 1-508-743-00 | 5P connector | |
| ●CN105 | 1-508-845-00 | 6P connector | |
| ●CN107 | 1-508-742-00 | 3P connector | |
| ●CN108 | 1-508-845-00 | 6P connector | |
| ⇒D101, 102 | 8-719-815-85 | 1S1585 | |
| ⇒D103 | 8-719-127-25 | RD27E-B2Z | |
| D104 | 8-719-815-55 | 1S1555 | |
| L101 | 1-407-186-XX | 4.7μH | |
| L102, 103 | 1-407-178-XX | 1μH | |
| L104 | 1-407-169-XX | 100μH | |
| L105 | 1-407-696-00 | 18μH | |
| L106 | 1-407-169-XX | 100μH | |
| Q101 | 8-765-300-00 | 2SC2009 | |
| Q102 | 8-724-375-01 | 2SC403C | |
| ⇒Q103 | 8-729-612-77 | 2SA1027R | |
| Q104 | 8-729-663-47 | 2SC1364 | |
| ⇒Q106 | 8-760-413-10 | 2SC1475 | |
| ⚠R126 | 1-246-979-00 | 1.2 1/8W carbon (nonflammable) | |
| RV101 | 1-224-645-XX | 10k, adjustable | |
| T101 | 1-404-096-00 | VHF | |
| T102 | 1-446-585-00 | Convertor | |
| ⚠TU101 | 1-463-242-00 | UHF ET Tuner U322 | |
| ⚠TU102 | 1-463-243-00 | VHF ET Tuner V314 | |

## TUNER CHASSIS

| | | | |
|---|---|---|---|
| ⚠ | 1-463-296-00 | Antenna booster (BT-971) | |
| ⚠ | 1-464-105-00 | RF modulator | |

**The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.**

- ⇒ : Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.
- Items marked "●" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

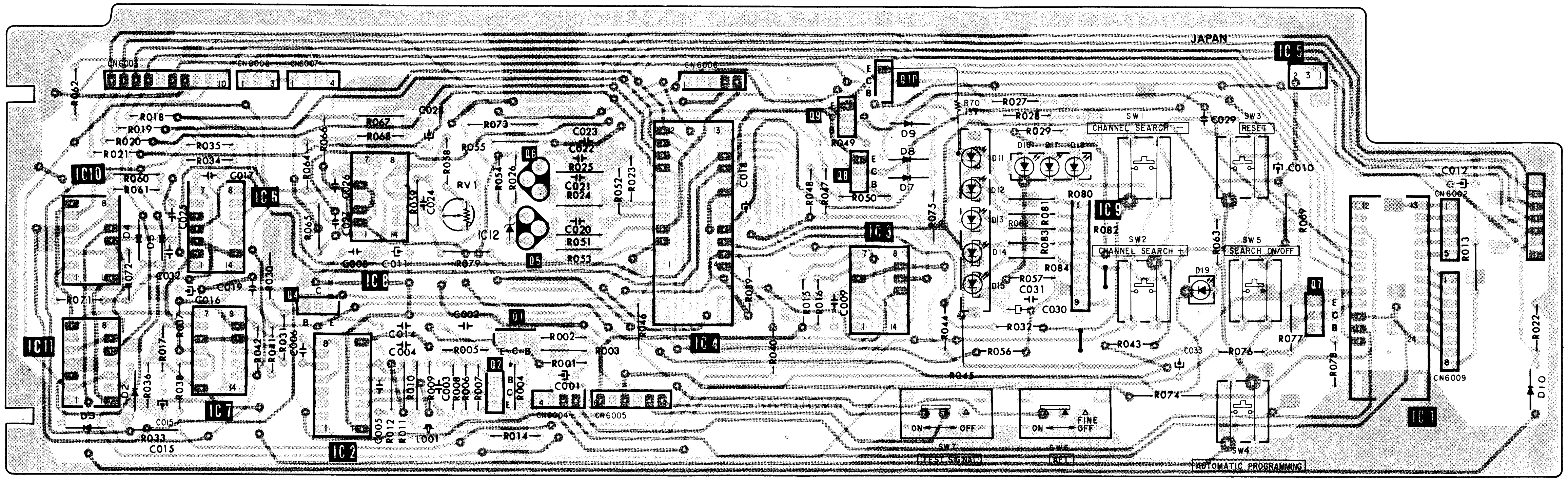
## 3. PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM

### CH-7 (AUTO TUNING), CI-1 (CHANNEL INDICATOR), PC-1 (REG), TU-11 (TUNER) AND IF-10 (VIF, SIF, AFT) PRINTED WIRING BOARDS

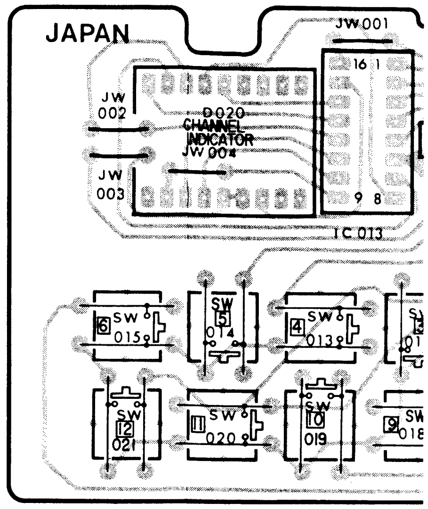
– Ref. No. CH-7, CI-1 BOARDS: 6000 Series PC-1 BOARD: 6500 Series TU-11 BOARD: 8100 Series IF-10 BOARD: 85

CH-7 BOARD

| | | |
|---|---|---|
| Q<br>IC | IC10 IC11 IC6 IC7 Q4 IC8 IC2 IC12 Q2 Q1 Q6 Q5 IC4 Q9 Q10 Q8 IC3 IC9 IC5 Q7 IC1 | Q<br>IC |
| D | 3 4 2 5 9 8 7 11 ~ 15 16 17 18 19 10 | D |
| ADJ | RV1 | ADJ |

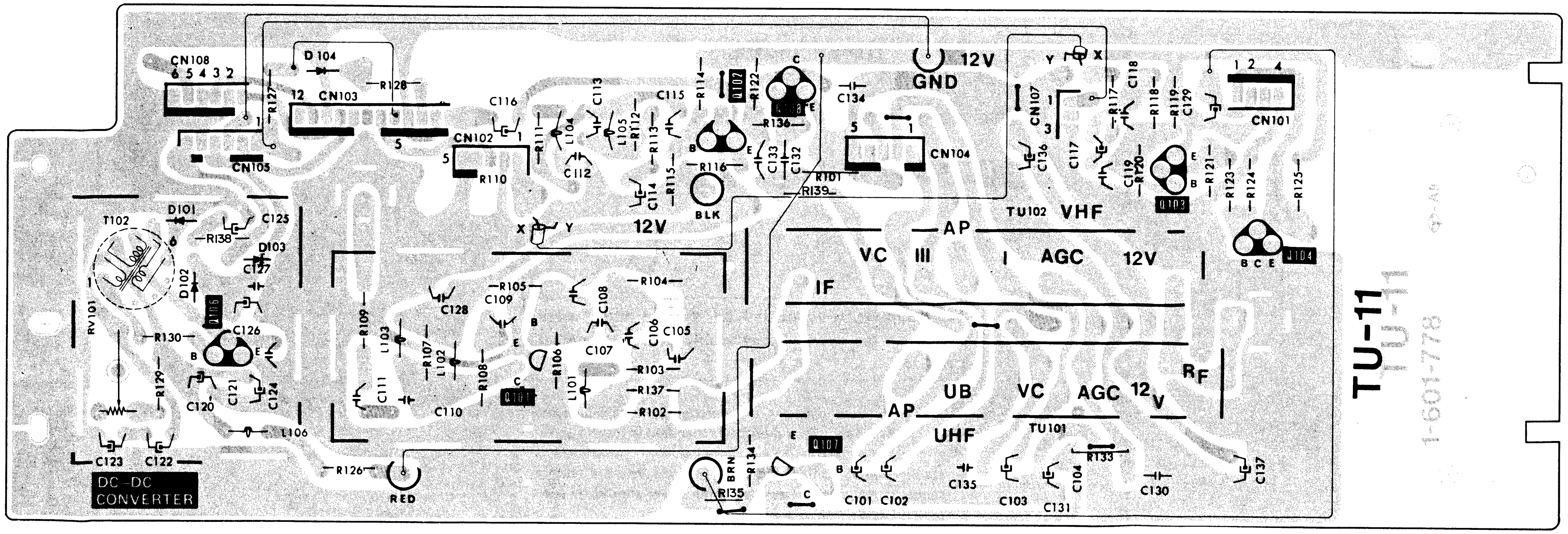

JAPAN
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
IC12
RV1
CHANNEL SEARCH –
CHANNEL SEARCH +
RESET
SEARCH ON/OFF
TEST SIGNAL
AFT
FINE
AUTOMATIC PROGRAMMING
ON OFF

CI-1 BOARD


JAPAN
CHANNEL INDICATOR
IC013
JW001
JW002
JW003

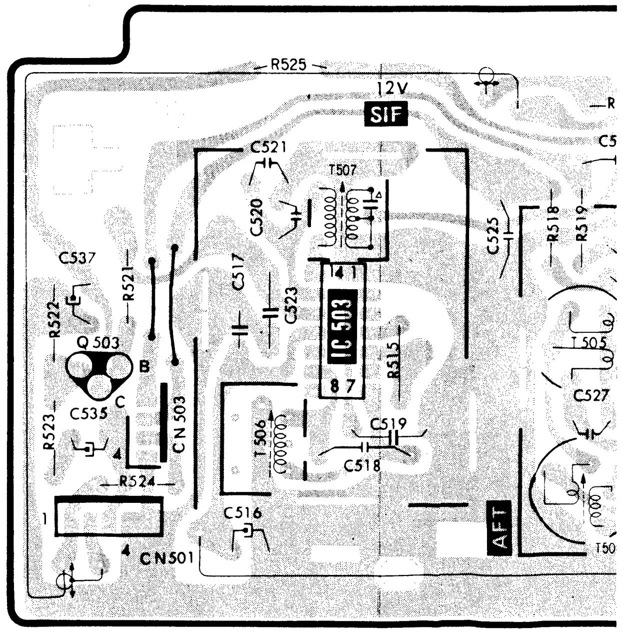
TU-11 BOARD

| | | |
|---|---|---|
| Q | 106 101 102 108 107 103 104 | Q |
| D | 101 102 103 104 | D |
| ADJ | RV101 | ADJ |


TU-11
1-601-778
12V
GND
BLK
RED
BRN
VHF
UHF
AGC
IF
RF
TU101
TU102
DC-DC CONVERTER
RV101

IF-10 BOARD

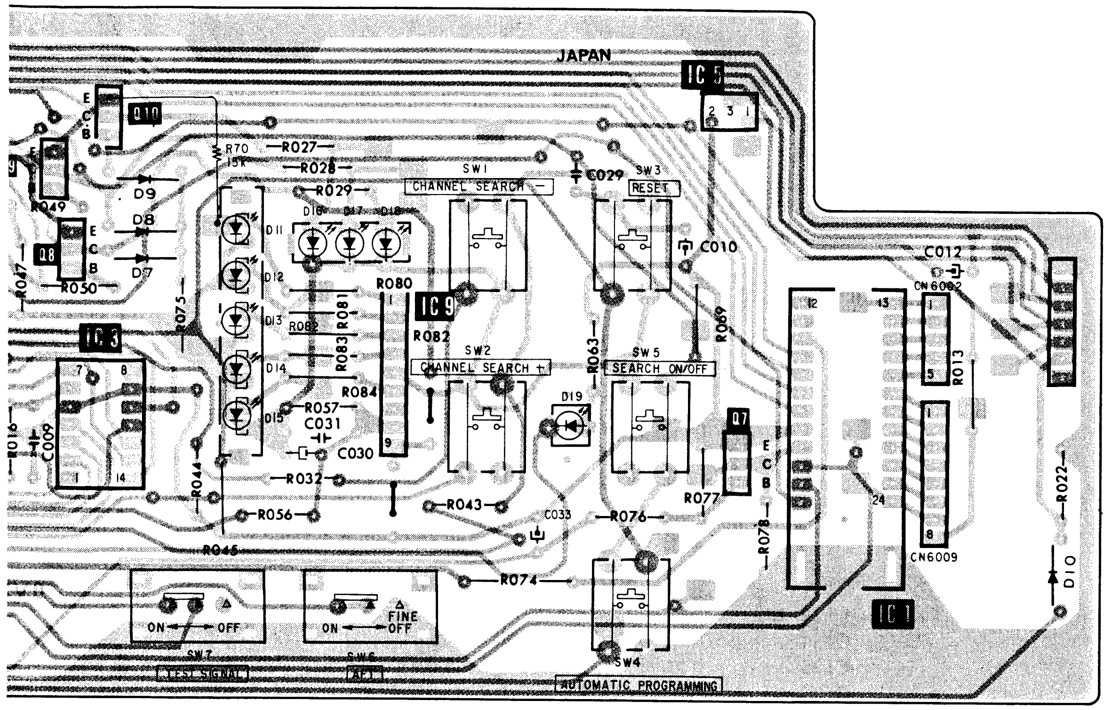
| | | |
|---|---|---|
| IC<br>Q | 503 IC503 | |
| ADJ | | |


12V
SIF
AFT
IC503
Q503
CN501
CN503
T506
T507

## R) AND IF-10 (VIF, SIF, AFT) PRINTED WIRING BOARDS

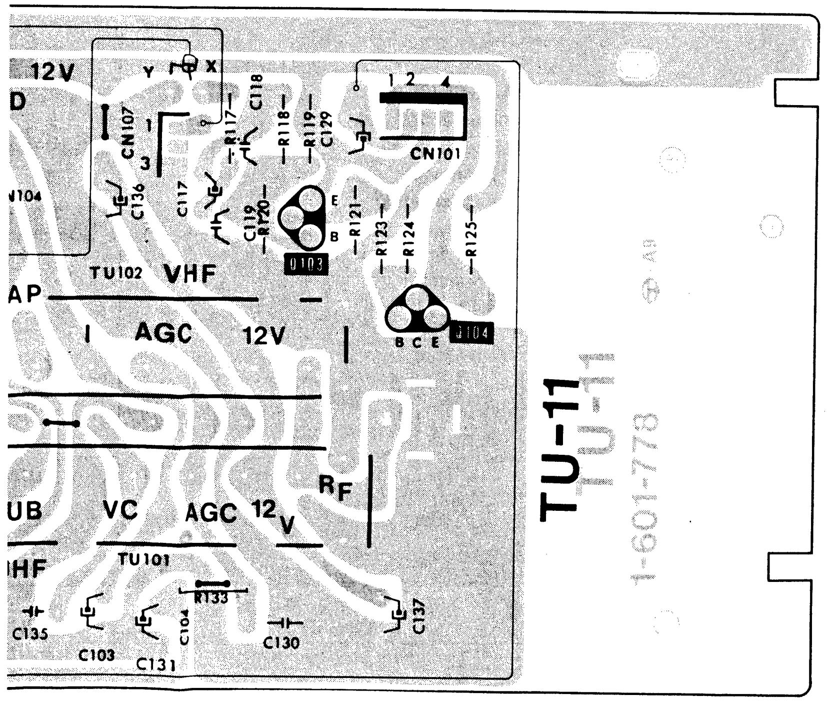
– Ref. No. CH-7, CI-1 BOARDS: 6000 Series PC-1 BOARD: 6500 Series TU-11 BOARD: 8100 Series IF-10 BOARD: 8500 Series CHASSIS: 9500 Series –

| | |
|---|---|
| Q9 Q10 Q8 IC3 IC9 IC5 Q7 IC1 | Q<br>IC |
| 9 8 7 11 ~ 15 16 17 18 19 10 | D |
| | ADJ |



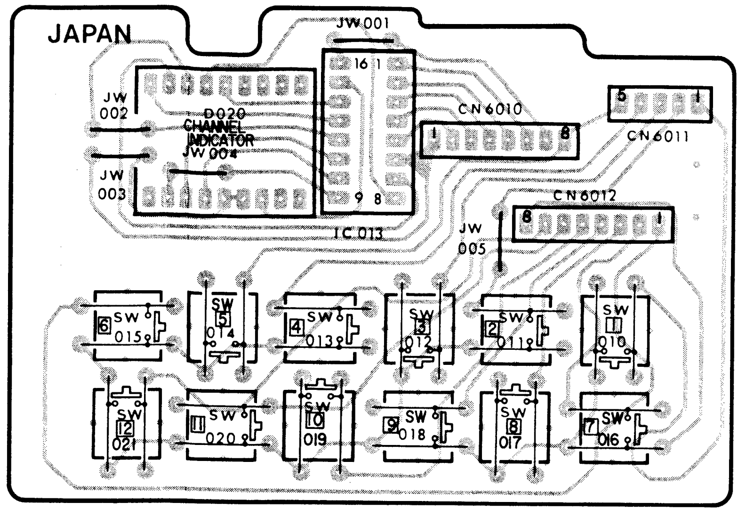
JAPAN
IC5
Q10
Q8
IC3
IC9
Q7
IC1
D7
D8
D9
D10
D11
D12
D13
D14
D15
D16
D17
D18
D19
R027
R028
R029
R032
R043
R044
R045
R047
R049
R050
R056
R057
R063
R069
R070
R074
R075
R076
R077
R078
R080
R081
R082
R083
R084
R013
R016
R022
C009
C010
C012
C029
C030
C031
C033
CN6002
CN6009
SW1 CHANNEL SEARCH
SW2 CHANNEL SEARCH
SW3 RESET
SW4 AUTOMATIC PROGRAMMING
SW5 SEARCH ON/OFF
SW6 AFT
SW7 TEST SIGNAL
ON OFF
ON FINE OFF

| | |
|---|---|
| 103 104 | Q |
| | D |
| | ADJ |



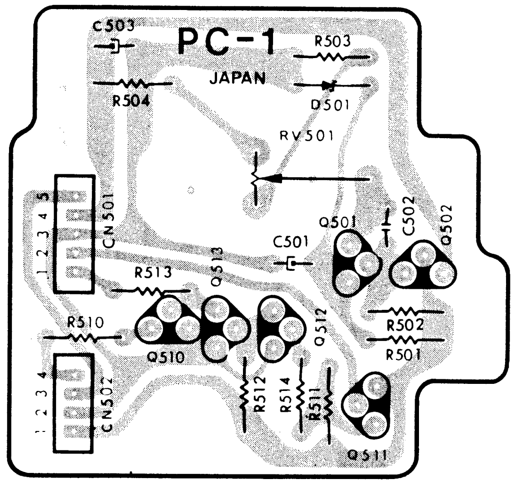
12V
CN107
CN101
CN104
C117
C118
C119
C129
C136
R117
R118
R119
R120
R121
R123
R124
R125
Q103
Q104
B C E
TU102 VHF
AGC 12V
TU-11
1-601-778
UB VC AGC 12V
RF
TU101
UHF
R133
C103
C104
C130
C131
C135
C137

CI-1 BOARD



JAPAN
JW001
JW002
JW003
JW004
JW005
D020 CHANNEL INDICATOR
IC013
CN6010
CN6011
CN6012
SW015
SW014
SW013
SW012
SW011
SW010
SW021
SW020
SW019
SW018
SW017
SW016

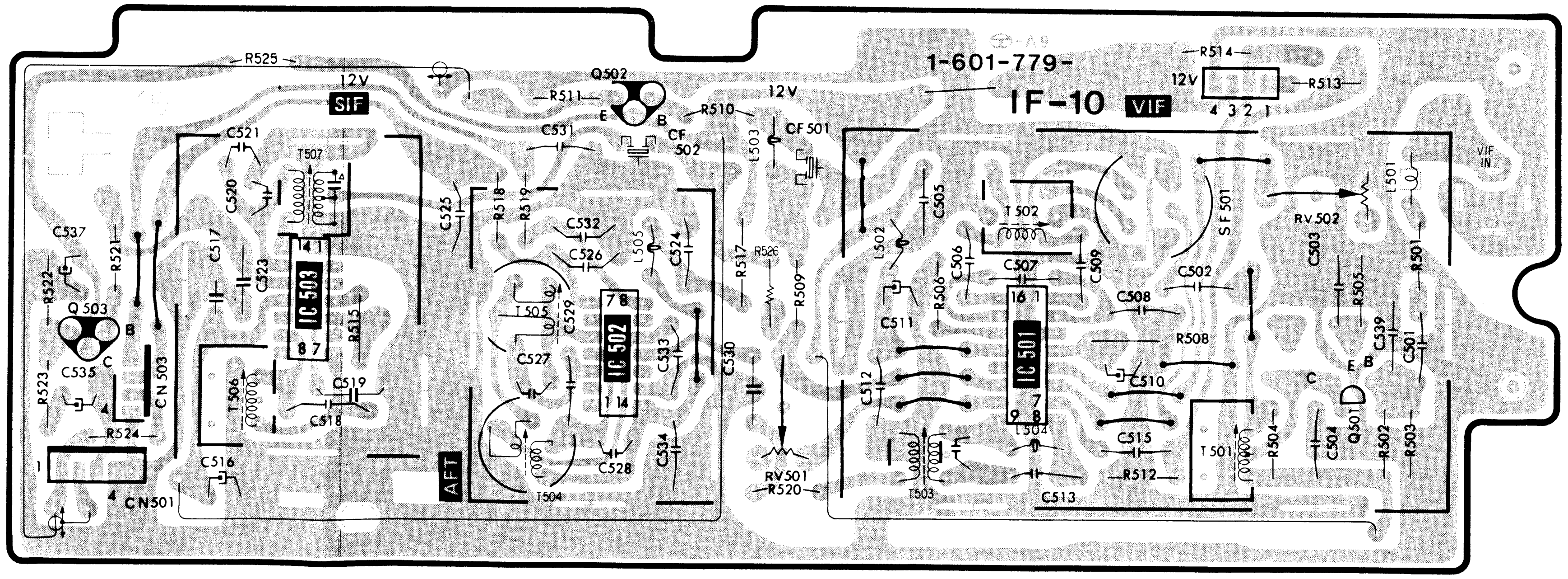
PC-1 BOARD



PC-1
JAPAN
C503
R503
R504
D501
RV501
CN501
CN502
C501
C502
Q501
Q502
Q510
Q511
Q512
Q513
R501
R502
R510
R511
R512
R513
R514

IF-10 BOARD

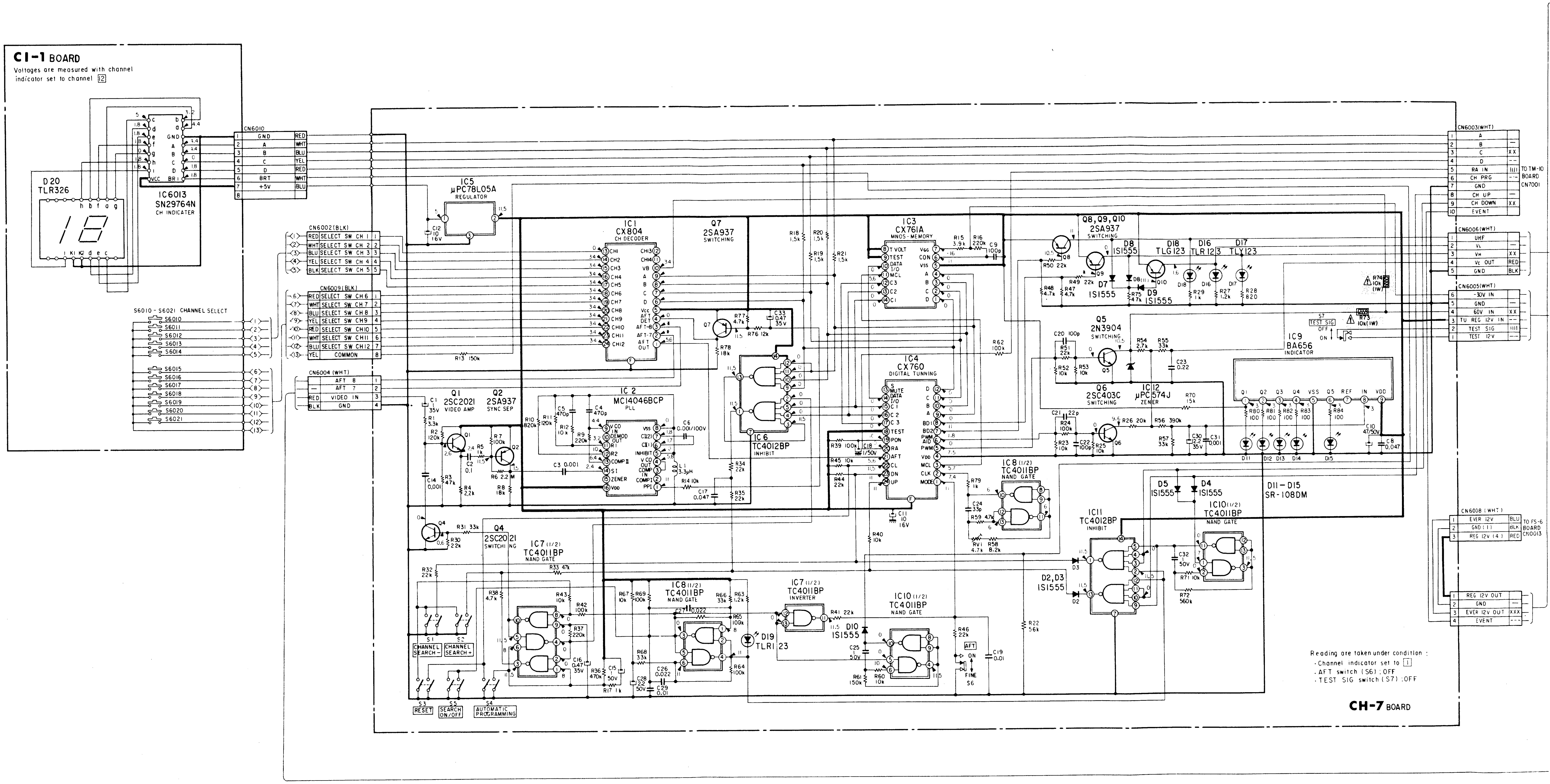
| | | |
|---|---|---|
| IC<br>Q | 503 IC503 502 IC502 IC501 501 | IC<br>Q |
| ADJ | RV501 RV502 | ADJ |



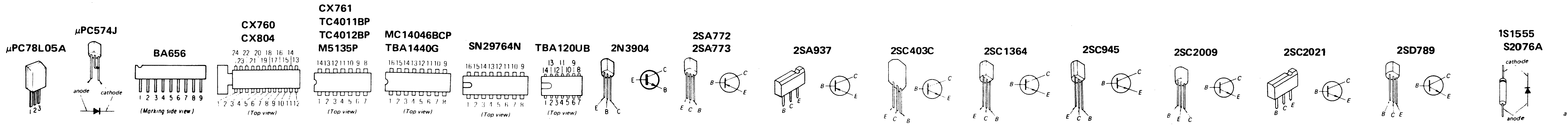
1-601-779
IF-10
VIF
SIF
AFT
12V
VIF IN
R525
R511
R510
R514
R513
Q502
Q503
Q501
CF501
CF502
L501
L502
L503
L504
L505
T502
T503
T504
T505
T506
T507
T501
IC501
IC502
IC503
SF501
RV501
RV502
CN501
C501
C502
C503
C504
C505
C506
C507
C508
C509
C510
C511
C512
C513
C515
C516
C517
C518
C519
C520
C521
C523
C524
C525
C526
C527
C528
C529
C530
C531
C532
C533
C534
C535
C537
C539
R501
R502
R503
R504
R505
R506
R508
R509
R512
R515
R517
R518
R519
R520
R521
R522
R523
R524
R526

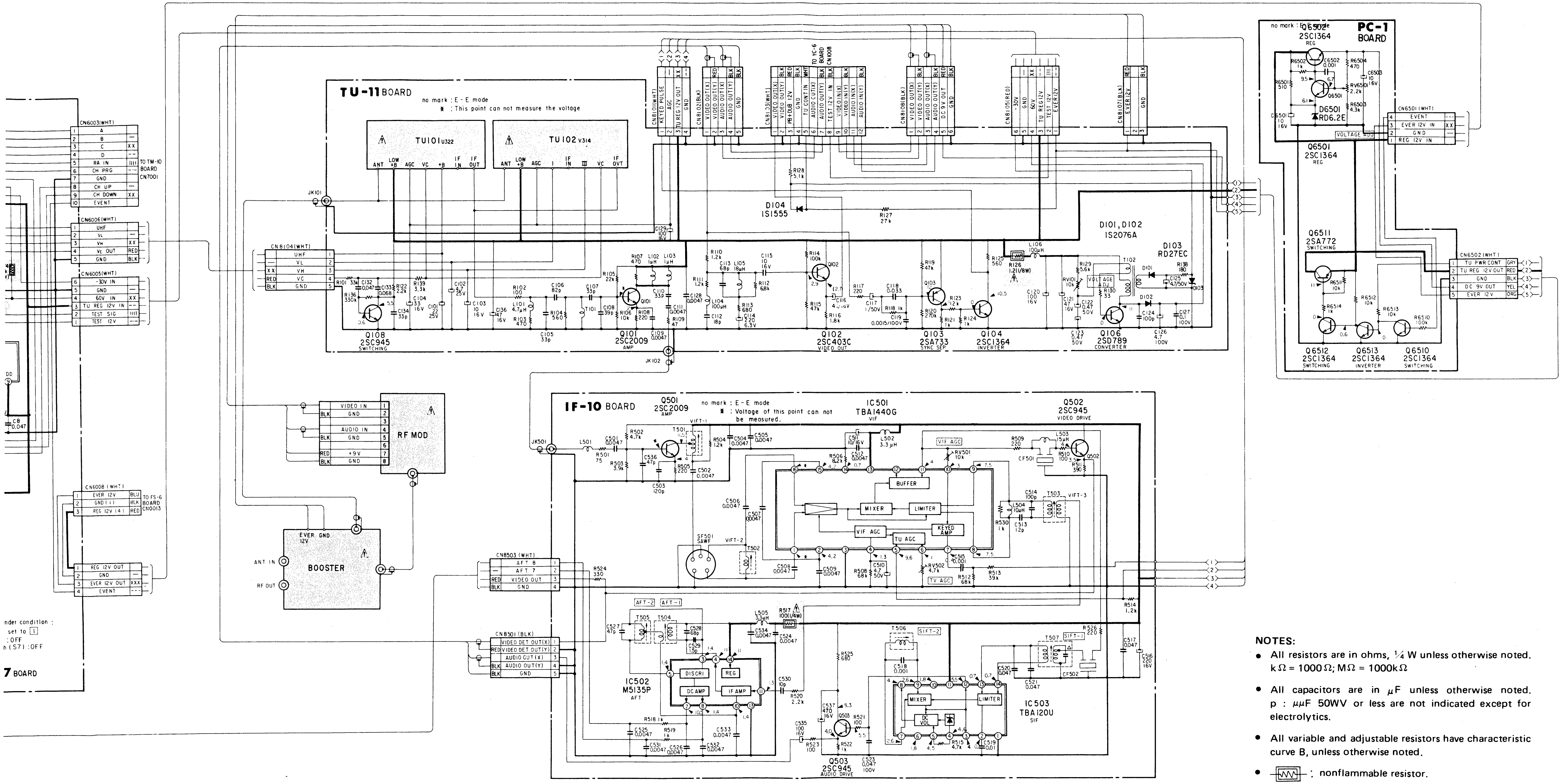
## CH-7 (AUTO TUNING), CI-1 (CHANNEL INDICATOR), PC-1 (REG), TU-11 (TUNER) AND IF-10 (VIF, SIF, AFT) BOARDS SCHEMATIC DIAGRAM

– Ref. No. CH-7, CI-1 BOARDS: 6000 Series PC-1 BOARD: 6500 Series TU-11 BOARD: 8100 Series IF-10 BOARD: 8500 Series CHASSIS: 9500 Series –

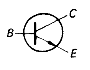

CI-1 BOARD
Voltages are measured with channel indicator set to channel 12
D20 TLR326
IC6013 SN29764N CH INDICATER
CN6010
S6010 - S6021 CHANNEL SELECT
CN6002 (BLK)
CN6009 (BLK)
CN6004 (WHT)
IC5 μPC78L05A REGULATOR
IC1 CX804 CH DECODER
Q7 2SA937 SWITCHING
IC3 CX761A MNOS-MEMORY
Q8, Q9, Q10 2SA937 SWITCHING
D8 1S1555
D18 TLG123
D16 TLR123
D17 TLY123
D7 1S1555
D9 1S1555
Q5 2N3904 SWITCHING
Q6 2SC403C SWITCHING
IC12 μPC574J ZENER
IC9 BA656 INDICATOR
S7 TEST SIG OFF ON
CN6003 (WHT)
TO TM-10 BOARD CN7001
CN6006 (WHT)
CN6005 (WHT)
Q1 2SC2021 VIDEO AMP
Q2 2SA937 SYNC SEP
IC2 MC14046BCP PLL
IC6 TC4012BP INHIBIT
IC4 CX760 DIGITAL TUNNING
IC8 (1/2) TC4011BP NAND GATE
D5 1S1555
D4 1S1555
D11 - D15 SR-108DM
IC11 TC4012BP INHIBIT
IC10 (1/2) TC4011BP NAND GATE
CN6008 (WHT)
TO FS-6 BOARD CN0013
Q4 2SC2021 SWITCHING
Q3
IC7 (1/2) TC4011BP NAND GATE
IC8 (1/2) TC4011BP NAND GATE
IC7 (1/2) TC4011BP INVERTER
IC10 (1/2) TC4011BP NAND GATE
D19 TLR123
D10 1S1555
D2, D3 1S1555
S1 CHANNEL SEARCH −
S2 CHANNEL SEARCH +
S3 RESET
S5 SEARCH ON/OFF
S4 AUTOMATIC PROGRAMMING
S6 AFT ON FINE
CH-7 BOARD

Reading are taken under condition :
- Channel indicator set to 1
- AFT switch (S6) : OFF
- TEST SIG switch (S7) : OFF

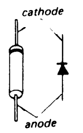

μPC78L05A
μPC574J
anode
cathode
BA656
(Marking side view)
CX760
CX804
(Top view)
CX761
TC4011BP
TC4012BP
M5135P
(Top view)
MC14046BCP
TBA1440G
(Top view)
SN29764N
(Top view)
TBA120UB
(Top view)
2N3904
2SA772
2SA773
2SA937
2SC403C
2SC1364
2SC945
2SC2009
2SC2021
2SD789
1S1555
S2076A
cathode
anode


TU-11 BOARD
no mark : E-E mode
✱ : This point can not measure the voltage
TU101 U322
TU102 V314
CN6003 (WHT)
TO TM-10 BOARD CN7001
CN6006 (WHT)
CN6005 (WHT)
CN8104 (WHT)
CN8101 (WHT)
CN8102 (BLK)
CN8103 (BLK)
TO YC-6 BOARD CN1008
CN8108 (BLK)
CN8105 (RED)
CN8107 (BLK)
JK101
JK102
D104 1S1555
D101, D102 1S2076A
D103 RD27EC
Q108 2SC945 SWITCHING
Q101 2SC2009 AMP
Q102 2SC403C VIDEO OUT
Q103 2SA733 SYNC SEP
Q104 2SC1364 INVERTER
Q106 2SD789 CONVERTER
PC-1 BOARD
no mark : E-E mode
Q6502 2SC1364 REG
Q6501 2SC1364 REG
D6501 RD6.2E
Q6511 2SA772 SWITCHING
Q6512 2SC1364 SWITCHING
Q6513 2SC1364 INVERTER
Q6510 2SC1364 SWITCHING
CN6501 (WHT)
CN6502 (WHT)
VOLTAGE ADJ
RF MOD
BOOSTER
ANT IN
RF OUT
CN6008 (WHT)
TO FS-6 BOARD CN0013
IF-10 BOARD
no mark : E-E mode
✱ : Voltage of this point can not be measured.
Q501 2SC2009 AMP
IC501 TBA1440G VIF
Q502 2SC945 VIDEO DRIVE
JK501
SF501 SAWF
VIFT-1
VIFT-2
VIFT-3
VIF AGC
TV AGC
BUFFER
MIXER
LIMITER
VIF AGC
TU AGC
KEYED AMP
CN8503 (WHT)
CN8501 (BLK)
AFT-2
AFT-1
IC502 M5135P AFT
DISCRI
REG
DC AMP
IF AMP
Q503 2SC945 AUDIO DRIVE
SIFT-2
SIFT-1
IC503 TBA120U SIF
MIXER
LIMITER
DC VOL
7 BOARD
nder condition :
set to 1
: OFF
h (S7) : OFF

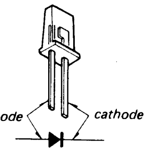
**SD789**



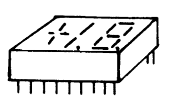
**1S1555**
**S2076A**


cathode
anode

**SR108DM**


anode
cathode

**TLR326**



**NOTES:**

- All resistors are in ohms, ¼ W unless otherwise noted. kΩ = 1000Ω; MΩ = 1000kΩ
- All capacitors are in μF unless otherwise noted. p : μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ▭ : nonflammable resistor.
- The red lines show the main voltages.
- All voltages are dc measured with a VOM (20kΩ/V).

**The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.**

Betamax
VIDEOCASSETTE RECORDER

# SL-C7E

No. 5
October, 1980

# SUPPLEMENT

Subject; CH-7 Board Change

This supplement includes production changes starting with Serial No. 32501 / 239001 and later.
File this supplement with the service manual.

## 1. INTRODUCTION

The CH-7 board has been changed into the CH-16 board.

## 2. INTERCHANGEABILITY

The former and new circuit boards are interchangeable.

## 3. CHANGED PARTS LIST

The CH-16 board parts list is shown on page 5.

SONY®
SERVICE MANUAL

## CH-16 (AUTO TUNING) PRINTED WIRING BOARD

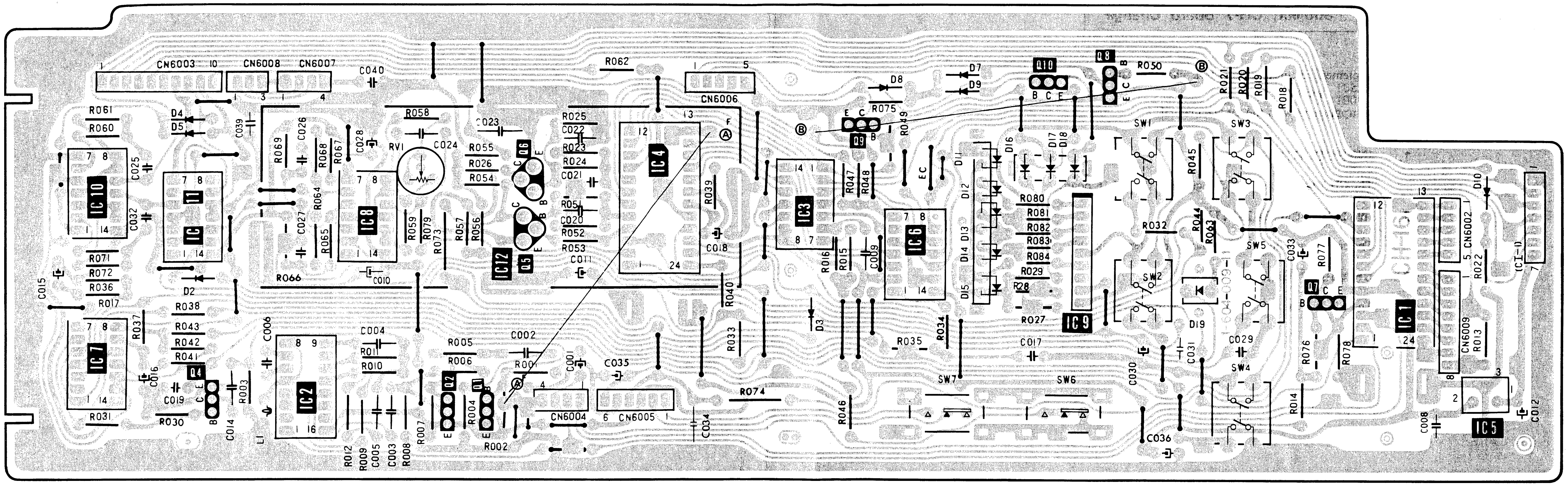
– Ref. No. 6000 series –

Q, IC: IC10 IC7 IC11 4 IC2 IC8 2 IC12 1 6 5 IC4 IC3 9 IC6 10 IC9 8 7 IC1 IC5

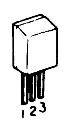
D: 4 5 2 3 8 7 9 11, 13, 12 14 15 16 17 18 19 10

ADJ: RV1

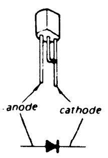
### CH-16 BOARD


CN6003
CN6008
CN6007
C040
R062
CN6006
D8
D7
D9
Q10
Q8
R050
R021
R020
R019
R018
R061
R060
D4
D5
C039
C026
R058
C023
R025
C022
R023
R024
C021
IC4
R075
Q9
R049
D16
D17
D18
SW1
SW3
IC10
C025
IC11
R069
R068
R067
C028
RV1
C024
R055
R026
R054
Q6
IC8
R064
C027
R065
R059
R079
R073
R057
R056
IC12
Q5
R051
C020
R052
R053
C011
R039
C018
IC3
R047
R048
D11
D12
D13
D14
D15
IC6
C009
R016
R015
R080
R081
R082
R083
R084
R029
R28
R027
IC9
R032
R045
R044
R063
SW2
SW5
C033
R077
Q7
D19
IC1
CN6002
R022
CN6009
R013
D10
C032
R071
R072
R036
R017
D2
R066
C010
R040
R033
D3
R034
R035
C017
C015
R037
R038
R043
R042
R041
C006
C004
R011
R010
R005
R006
C002
R001
C001
C035
R074
C029
SW4
SW6
SW7
C030
C031
R076
R078
IC7
C016
Q4
C019
R003
IC2
Q2
Q1
R004
CN6004
CN6005
C034
R046
C036
R014
C008
IC5
C012
R031
R030
C014
L1
R012
R009
C005
C003
R008
R007
R002

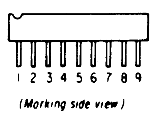
**µPC78L05A**



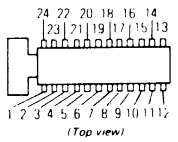
**µPC574J**


anode
cathode

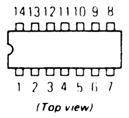
**BA656**


1 2 3 4 5 6 7 8 9
(Marking side view)

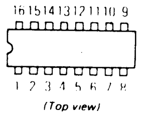
**CX760**
**CX804**


24 22 20 18 16 14
23 21 19 17 15 13
1 2 3 4 5 6 7 8 9 10 11 12
(Top view)

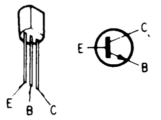
**CX761**
**TC4011BP**
**TC4012BP**
**M5135P**


14 13 12 11 10 9 8
1 2 3 4 5 6 7
(Top view)

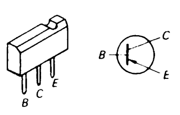
**MC14046BCP**
**TBA1440G**


16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8
(Top view)

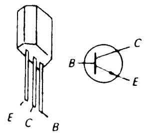
**2N3904**



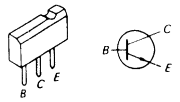
**2SA937**



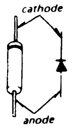
**2SC403C**



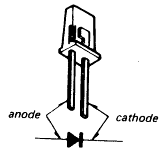
**2SC2021**



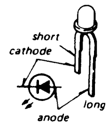
**1S1555**
**S2076A**


cathode
anode

**SR108DM**

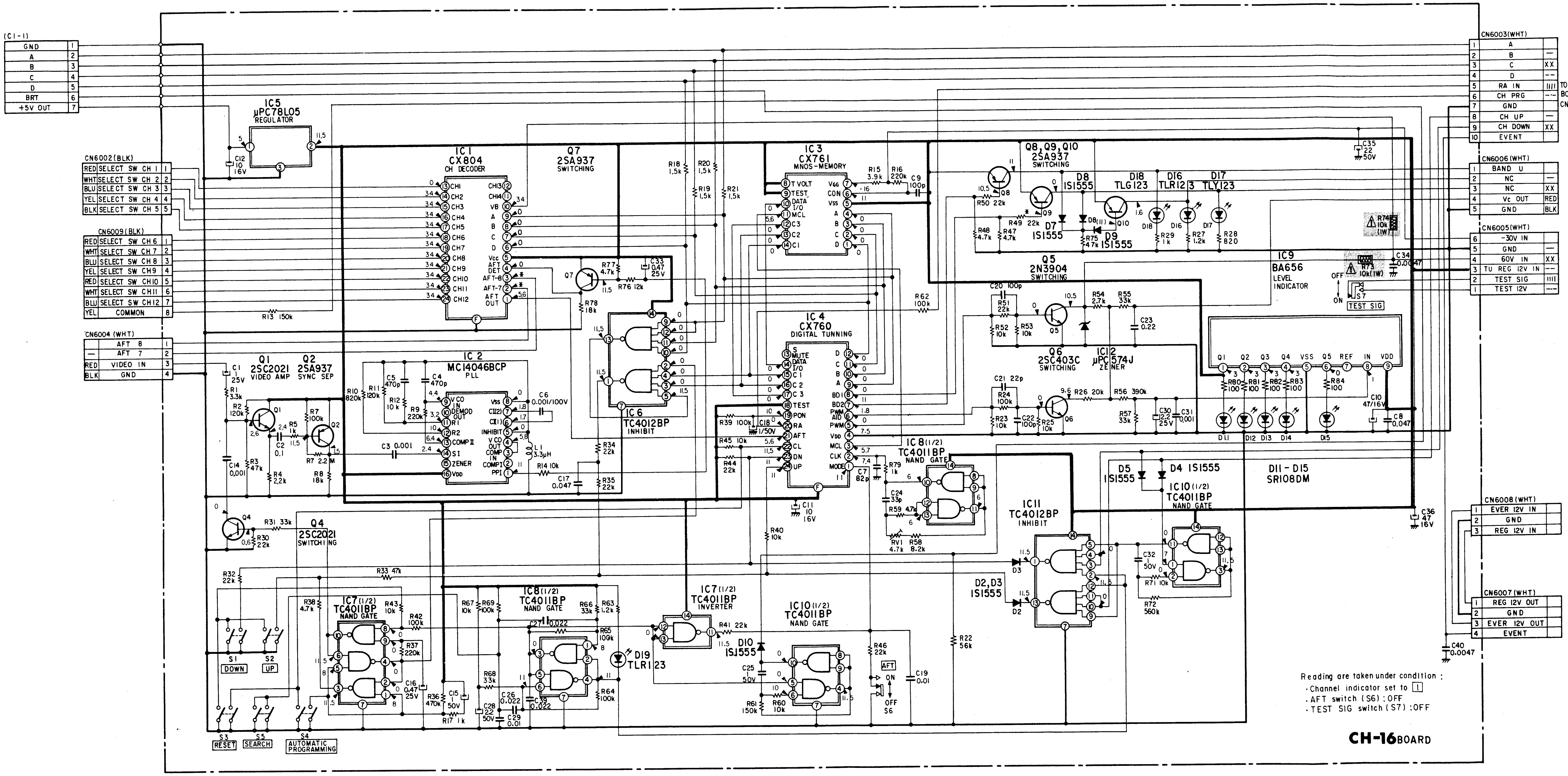

anode
cathode

**TLG123**
**TLR123**
**TLY123**


short
cathode
long
anode

## CH-16 (AUTO TUNING) BOARD SCHEMATIC DIAGRAM

– Ref. No. 6000 series –


(C1-1)
GND 1
A 2
B 3
C 4
D 5
BRT 6
+5V OUT 7
IC5 μPC78L05 REGULATOR
CN6002(BLK)
RED SELECT SW CH 1 1
WHT SELECT SW CH 2 2
BLU SELECT SW CH 3 3
YEL SELECT SW CH 4 4
BLK SELECT SW CH 5 5
CN6009(BLK)
RED SELECT SW CH 6 1
WHT SELECT SW CH 7 2
BLU SELECT SW CH 8 3
YEL SELECT SW CH 9 4
RED SELECT SW CH10 5
WHT SELECT SW CH11 6
BLU SELECT SW CH12 7
YEL COMMON 8
CN6004 (WHT)
AFT 8 1
AFT 7 2
RED VIDEO IN 3
BLK GND 4
IC1 CX804 CH DECODER
Q7 2SA937 SWITCHING
IC3 CX761 MNOS-MEMORY
Q8,Q9,Q10 2SA937 SWITCHING
D8 1S1555
D18 TLG123
D16 TLR123
D17 TLY123
IC2 MC14046BCP PLL
Q1 2SC2021 VIDEO AMP
Q2 2SA937 SYNC SEP
IC6 TC4012BP INHIBIT
IC4 CX760 DIGITAL TUNNING
Q5 2N3904 SWITCHING
Q6 2SC403C SWITCHING
IC12 μPC574J ZENER
IC9 BA656 LEVEL INDICATOR
IC8(1/2) TC4011BP NAND GATE
D5 1S1555
D4 1S1555
IC10(1/2) TC4011BP NAND GATE
IC11 TC4012BP INHIBIT
D11-D15 SR108DM
D2,D3 1S1555
Q4 2SC2021 SWITCHING
IC7(1/2) TC4011BP NAND GATE
IC8(1/2) TC4011BP NAND GATE
IC7(1/2) TC4011BP INVERTER
IC10(1/2) TC4011BP NAND GATE
D10 1S1555
D19 TLR123
S1 DOWN
S2 UP
S3 RESET
S5 SEARCH
S4 AUTOMATIC PROGRAMMING
AFT ON OFF S6
S7 TEST SIG
CN6003(WHT)
1 A
2 B —
3 C XX
4 D --
5 RA IN ||||
6 CH PRG -·-
7 GND
8 CH UP —
9 CH DOWN XX
10 EVENT
TO TM-10 BOARD CN7001
CN6006(WHT)
1 BAND U —
2 NC —
3 NC XX
4 Vc OUT RED
5 GND BLK
CN6005(WHT)
6 -30V IN —
5 GND —
4 60V IN XX
3 TU REG 12V IN --
2 TEST SIG ||||
1 TEST 12V -·-
CN6008(WHT)
1 EVER 12V IN
2 GND
3 REG 12V IN
CN6007(WHT)
1 REG 12V OUT
2 GND
3 EVER 12V OUT
4 EVENT
Reading are taken under condition :
· Channel indicator set to 1
· AFT switch (S6) : OFF
· TEST SIG switch (S7) : OFF
CH-16 BOARD

NOTES:

- All resistors are in ohms, ¼ W unless otherwise noted. kΩ = 1000Ω; MΩ = 1000kΩ
- All capacitors are in μF unless otherwise noted. p : μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ⊣WW⊢ : nonflammable resistor.
- The red lines show the main voltages.
- All voltages are dc measured with a VOM (20kΩ/V).

**The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.**

## CH-16 BOARD ELECTRICAL PARTS LIST

### CH-16 BOARD

| *Ref. No.* | *Part No.* | *Description* | | *Remark* |
|---|---|---|---|---|
| ● | A-6725-215-A | CH-16 Board, complete | | |
| C1 | 1-127-453-00 | 1 | 25V | elect |
| C2 | 1-108-251-00 | 0.1 | | mylar |
| C3 | 1-161-323-00 | 0.001 | | |
| C4, 5 | 1-161-319-00 | 470p | | |
| C6 | 1-108-614-00 | 0.001 | 100V | mylar |
| C7 | 1-102-974-00 | 82P | | |
| C8 | 1-161-021-00 | 0.047 | | |
| C9 | 1-161-271-00 | 100p | | |
| C10 | 1-123-319-00 | 47 | 16V | elect |
| C11, 12 | 1-123-316-00 | 10 | 16V | elect |
| C14 | 1-161-323-00 | 0.001 | | |
| C15 | 1-123-352-00 | 1 | 50V | elect |
| C16 | 1-127-451-00 | 0.47 | 25V | elect |
| C17 | 1-161-021-00 | 0.047 | | |
| C18 | 1-123-352-00 | 1 | 50V | elect |
| C19 | 1-161-013-00 | 0.01 | | |
| C20 | 1-161-271-00 | 100p | | |
| C21 | 1-161-263-00 | 22p | | |
| C22 | 1-161-271-00 | 100p | | |
| C23 | 1-108-820-00 | 0.22 | | mylar |
| C24 | 1-161-265-00 | 33p | | |
| C25 | 1-123-228-00 | 1 | 50V | elect |
| C26, 27 | 1-161-223-00 | 0.022 | | |
| C28 | 1-123-353-00 | 2.2 | 50V | elect |
| C29 | 1-161-013-00 | 0.01 | | |
| C30 | 1-123-612-00 | 2.2 | 50V | elect |
| C31 | 1-161-323-00 | 0.001 | | |
| C32 | 1-123-228-00 | 1 | 50V | elect |
| C33 | 1-127-451-00 | 0.47 | 25V | elect |
| C34 | 1-108-373-00 | 0.0047 | 100V | mylar |
| C35 | 1-123-357-00 | 22 | 50V | elect |
| C36 | 1-123-319-00 | 47 | 16V | elect |
| C39 | 1-161-017-00 | 0.022 | | |
| C40 | 1-102-125-00 | 0.0047 | | |
| ●CN2 | 1-508-735-21 | 5P connector | | |
| ●CN3 | 1-508-736-00 | 10P connector | | |
| ●CN4 | 1-508-847-00 | 4P connector | | |
| ●CN5 | 1-508-848-00 | 6P connector | | |
| ●CN6 | 1-508-735-00 | 5P connector | | |
| ●CN7 | 1-508-847-00 | 4P connector | | |
| ●CN8 | 1-508-734-00 | 3P connector | | |
| ●CN9 | 1-508-849-00 | 8P connector | | |

| *Ref. No.* | *Part No.* | *Description* | | *Remark* |
|---|---|---|---|---|
| D2–5 | 8-719-815-55 | 1S1555 | | |
| D7–10 | 8-719-815-55 | 1S1555 | | |
| ⇒ D11–15 | 8-719-311-23 | SEL1122P-N | | |
| D16 | 8-719-812-31 | TLR123 | | |
| D17 | 8-719-812-32 | TLY123 | | |
| D18 | 8-719-812-33 | TLG123 | | |
| D19 | 8-719-812-31 | TLR123 | | |
| IC1 | 8-758-040-01 | CX804 | | |
| IC2 | 8-759-040-46 | MC14046BCP | | |
| IC3 | 8-757-611-00 | CX761A | | |
| IC4 | 8-757-600-00 | CX760 | | |
| IC5 | 8-759-108-05 | μPC78L05A | | |
| IC6 | 8-759-240-12 | TC4012BP | | |
| IC7, 8 | 8-759-240-11 | TC4011BP | | |
| IC9 | 8-759-965-60 | BA656 | | |
| IC10 | 8-759-240-11 | TC4011BP | | |
| IC11 | 8-759-240-12 | TC4012BP | | |
| IC12 | 8-759-157-40 | μPC574J | | |
| L1 | 1-407-184-XX | 3.3μH | | |
| Q1 | 8-729-902-11 | 2SC2021 | | |
| Q2 | 8-729-993-72 | 2SA937 | | |
| Q4 | 8-729-902-11 | 2SC2021 | | |
| Q5 | 8-729-139-04 | 2N3904 | | |
| Q6 | 8-724-375-01 | 2SC403C | | |
| Q7–10 | 8-729-993-72 | 2SA937 | | |
| R6 | 1-202-463-00 | 2.2M | 1/4W | conposition |
| ⚠R73, 74 | 1-213-155-00 | 10k | 1W | metal oxide (nonflammable) |
| RV1 | 1-224-251-XX | 4.7k, adjustable | | |
| S1–5 | 1-552-174-00 | Push button | | |
| S6, 7 | 1-516-226-00 | Slide | | |

**The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.**

- ⇒ : Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.
- Items marked "●" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

Betamax
VIDEOCASSETTE RECORDER

# SL-C7E

No. 4
July, 1980

# SUPPLEMENT

Subject: Switching Mode Regulator Alignment

1. The adjustment procedure of the switching mode regulator (SR-08) has been changed as follows for increasing reliability.
2. Service kit

SONY®
SERVICE MANUAL

## 1. REG 12V ADJUSTMENT

This adjustment should be executed after the replacement of IC1, R210, through R213, and RV201.

**Caution:** Discharge C108 with a resistor of 1kΩ (more than 2W). If it is not discharged, you will get a shock.

1) Remove CN0010 off the FS-6 board.

2) Connect the VOM at the point shown in Fig. 1.

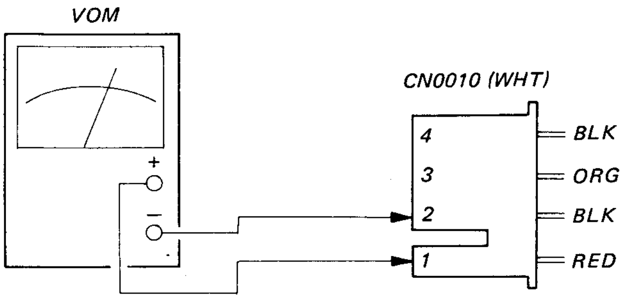


*Fig. 1.*

3) Adjust RV201 for 12.1 ± 0.1 V.

4) Connect CN0010 as it was.

5) Set up the PLAY mode.

6) Check that the VOM reading is within the value in Step 3). If it is not, readjust RV201.

## 2. EVER 12V ADJUSTMENT

This adjustment should be executed after the replacement of R220 through R222, RV202, and D209.

**Caution:** Discharge C108 with a resistor of 1kΩ (more than 2W). If it is not discharged, you will get a shock.

1) Remove CN0011 off the FS-6 board and CN7004 off the TM-11 board.

2) Connect the VOM at the point shown in Fig. 2.

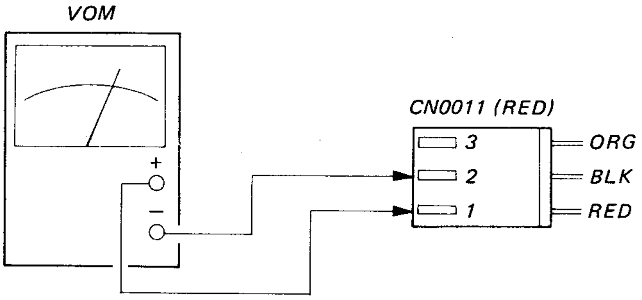


*Fig. 2.*

3) Adjust RV202 for 12 V ± 0.1 V.

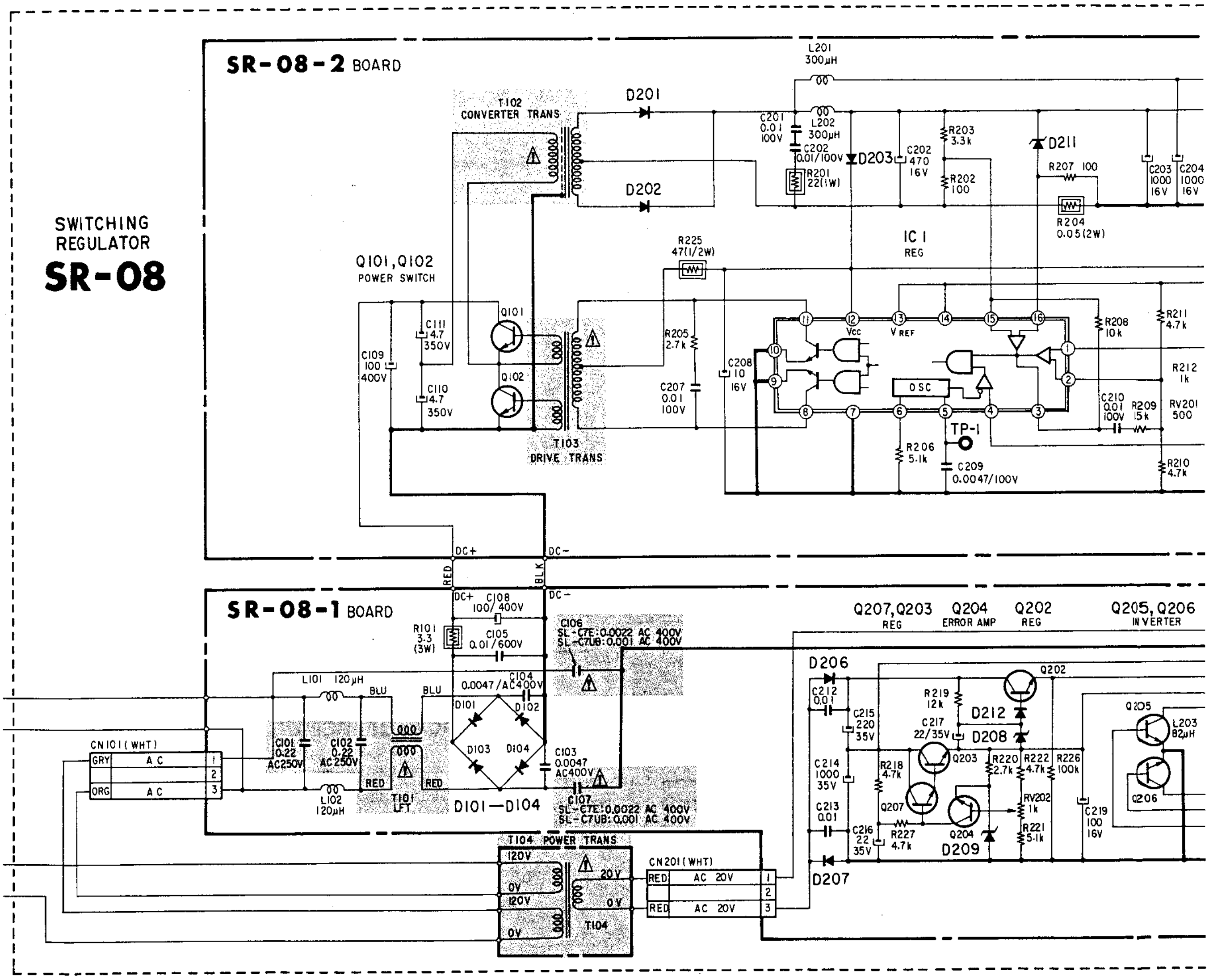
4) Connect CN0011 and CN7004 as they were.

5) Place the VTR into an optional mode.

6) Check the VOM reading is within the value in Step 3). If it is not, adjust RV202

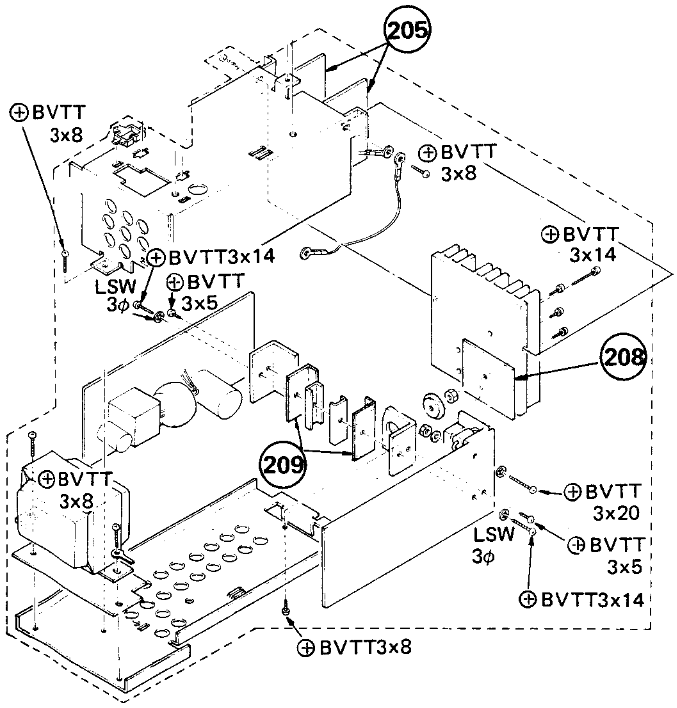
## 3. SAFETY SPECIFICATION PARTS

Safety specification parts have been changed as follow.


SWITCHING REGULATOR
SR-08
SR-08-2 BOARD
T102 CONVERTER TRANS
D201
D202
L201 300μH
C201 0.01 100V
L202 300μH
C202 0.01/100V
R201 22(1W)
D203
C202 470 16V
R203 3.3k
R202 100
D211
R207 100
R204 0.05(2W)
C203 1000 16V
C204 1000 16V
IC1 REG
R225 47(1/2W)
Q101, Q102 POWER SWITCH
Q101
Q102
C111 4.7 350V
C109 100 400V
C110 4.7 350V
T103 DRIVE TRANS
R205 2.7k
C207 0.01 100V
C208 10 16V
Vcc
V REF
OSC
R206 5.1k
TP-1
C209 0.0047/100V
R208 10k
R211 4.7k
R212 1k
C210 0.01 100V
R209 15k
RV201 500
R210 4.7k
DC+
DC-
RED
BLK
SR-08-1 BOARD
C108 100/400V
R101 3.3 (3W)
C105 0.01/600V
C106 SL-C7E:0.0022 AC 400V SL-C7UB:0.001 AC 400V
L101 120μH
BLU
C104 0.0047/AC400V
D101
D102
D103
D104
C101 0.22 AC250V
C102 0.22 AC250V
T101 LFT
RED
L102 120μH
C103 0.0047 AC400V
C107 SL-C7E:0.0022 AC 400V SL-C7UB:0.001 AC 400V
D101—D104
CN101 (WHT)
GRY AC
ORG AC
T104 POWER TRANS
120V
0V
20V
T104
CN201 (WHT)
RED AC 20V
Q207, Q203 REG
Q204 ERROR AMP
Q202 REG
Q205, Q206 INVERTER
D206
C212 0.01
C215 220 35V
R219 12k
C217 22/35V
D212
D208
Q202
Q203
C214 1000 35V
R218 4.7k
Q207
R220 2.7k
R222 4.7k
R226 100k
RV202 1k
R221 5.1k
C213 0.01
C216 22 35V
R227 4.7k
Q204
D209
D207
Q205
L203 82μH
Q206
C219 100 16V

| *Ref. No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ⚠C101, 102 | 1-130-160-11 | 0.22, AC250V, film | |
| ⚠C106, 107 | 1-161-734-11 | 0.0022, AC400V, film, SL-C7E | |
| ⚠ | 1-161-826-11 | 0.001, AC400V, film, SL-C7UB | |
| ⚠T101 | 1-421-377-11 | LFT | |
| ⚠T102 | 1-446-558-11 | Converter | |
| ⚠T103 | 1-437-085-11 | Drive | |
| ⚠T104 | 1-446-589-12 | Power | |

**The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.**


205
⊕BVTT 3x8
⊕BVTT 3x8
⊕BVTT3x14
⊕BVTT 3x14
LSW 3φ
⊕BVTT 3x5
208
209
⊕BVTT 3x8
⊕BVTT 3x20
LSW 3φ
⊕BVTT 3x5
⊕BVTT3x14
⊕BVTT3x8

| *No.* | *Part No.* | *Description* | *Remark* |
|---|---|---|---|
| ⚠205 | 2-430-138-00 | PLATE, insulating | |
| ⚠208 | 2-430-132-00 | SHEET, rubber (large) | |
| ⚠209 | 2-430-133-00 | SHEET, rubber (small) | |

**The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.**

## 4. NOTES ON PART REPLACEMENT

### a. Replacement of Q101, Q102

Replacement parts of Q101 and Q102 should be used the service kit.

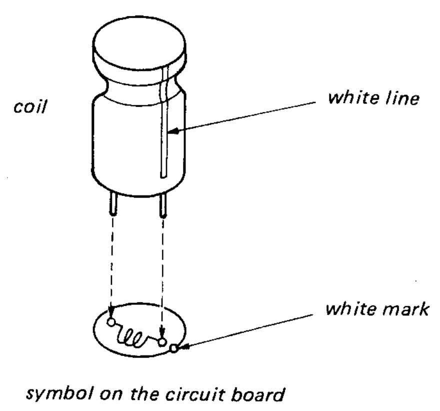
All including parts in the service kit should be replaced when both or either of the transistors is defective.

Service Kit

| | | |
|---|---|---|
| Part No. | A-6701-141-A | |
| Assembly Parts | transistor 2SC2335 ..... | 2pcs. |
| | rubber sheet ......... | 2pcs. |
| | resistor 3.3 (3W) ....... | 1pc. |
| | (for R101) | |

### b. Replacement of L201 and L202

Attach the L201 and L202 as shown in Fig. 3 because the L201 and L202 have polarity.


coil
white line
white mark
symbol on the circuit board

## 5. KNOW-HOW OF REPAIR

**Note:** ① ——► ② ——► . . . shows the order of breakable parts.

The breakable parts in the excessive load of the SYS 12 V line of the REG 12 V.

① Q101, Q102 ——► ② R101 ——► ③ D201, D202 ——► ④ D101 to D104

The breakable parts in the excessive load of the EVER 30 V line of EVER 12 V.

① Q202, Q204 ——► ③ Q207

The breakable parts at the wrong switching of the INPUT switch (110 V – 127 V –   – 220 V – 240 V).

① T104 ——► ② C214, C215

# SL-C7E

# SERVICE MANUAL

No. 6
July, 1981

# SUPPLEMENT

**SUBJECT: Addition of silver metallic color case**

File this supplement with the service manual.

| Part Name | Part No. | |
|---|---|---|
| | Dark Gray Color Case | Silver Metallic Color Case |
| PANEL ASS'Y, front | A-6703-062-A | A-6703-186-A |
| DOOR, front | 3-659-589-21 | 3-659-589-63 |
| CASE, upper | 3-662-292-00 | 3-669-001-51 |
| DOOR, preset | 3-659-599-21 | 3-659-599-91 |
| LID ASS'Y, cassette-up | X-3662-214-0 | X-3662-248-0 |
| EMBLEM ASS'Y (P) (X-3658-101-0) | 3-703-471-00 | 3-703-471-00 |
| COVER ASS'Y, counter | X-3662-205-0 | X-3664-306-0 |
| COMMANDER ASS'Y, remote | A-6701-071-A | A-6701-174-A |
| CASE (UPPER) ASS'Y | X-3662-213-0 | X-3662-249-0 |
| INDIVIDUAL CARTON ASS'Y (X-3662-220-0) | 3-662-390-00 | 3-662-391-00 |

**Note:** Part Numbers of emblem ass'y (P) and individual carton ass'y of dark gray color case are changed as above.

VIDEOCASSETTE RECORDER

SONY®

Betamax
VIDEOCASSETTE RECORDER

# SL-C7F

No. 1
September, 1980

# SUPPLEMENT

Subject: Alignment

SONY®
SERVICE MANUAL

# TABLE OF CONTENTS

## 1. PREPARATION FOR MECHANICAL SECTION CHECK, ADJUSTMENT, AND REPLACEMENT

1-1. Disassembly . . . . . . . . . . 1-1
1-2. Notes on Maintenance . . . . . . . . . . 1-2
1-3. Operating Recorder Without Cassette Installed 1-3
1-4. Stopping Slack Sensor Operation . . . . . . . . 1-3
1-5. Tools and Fixtures Required . . . . . . . . . . 1-4

## 2. PERIODIC CHECK AND MAINTENANCE

2-1. Maintenance after Repair . . . . . . . . . . 2-1
2-2. Periodic Check Items . . . . . . . . . . 2-1
2-3. Others . . . . . . . . . . 2-2

## 3. CHECK, ADJUSTMENT, AND, REPLACEMENT PROCEDURES

3-1. Replacement of Video Head Disk Assembly and Eccentricity Adjustment . . . . . . . . . . 3-1
3-2. Replacement of Drum Assembly . . . . . . . . 3-2
3-3. Replacement of Capstan DC motor . . . . . . . 3-4
3-4. Replacement and Adjustment of Tension Regulator Arm Plate Assembly and Tension Regulator Band Assembly . . . . . . . . . . 3-5
3-4-1. When Tension Regulator Band Assembly is Replaced: . . . . . . . . . . 3-5
3-4-2. When Tension Regulator Arm Plate is Replaced: . . . . . . . . . . 3-6
3-5. Replacement of Cassette-lift Assembly . . . . . 3-7
3-6. Adjustment of Reel Table Height . . . . . . . . 3-7
3-7. Position Adjustment, Pause Solenoid . . . . . . 3-7
3-8. Position Adjustment of Function Solenoid . . . 3-8
3-8-1. Position Adjustment of PLAY, F.FWD and REW Solenoids . . . . . . . . . . 3-8
3-8-2. Position Adjustment fo Cassette Eject Solenoid 3-9
3-9. Adjustment of Threading and Unthreading . . . 3-10
3-9-1. Operation Check of Cassette-in Switch . . . . . 3-10
3-9-2. Position Adjustment of Threading Unit B Assembly and Control Plate . . . . . . . . . . 3-10
3-9-3. Position Adjustment of Gear Pulley Hold Arm Assembly . . . . . . . . . . 3-11
3-9-4. Adhesion of Brake Shoe . . . . . . . . . . 3-11
3-9-5. Clearance Adjustment of Cassette-lift Assembly Arm . . . . . . . . . . 3-11
3-9-6. Clearance Adjustment of Ring Arm . . . . . . . 3-12
3-9-7. Check of Unthreading Completion . . . . . . . 3-12
3-10. Position Adjustment of Lid Opener . . . . . . . 3-13
3-11. Replacement and Adjustment of Threading Ring Assembly . . . . . . . . . . 3-14
3-12. Position Adjustment of Pinch Roller Solenoid . 3-15
3-12-1. Parallelism Adjustment of Pinch Press Lever . . 3-15
3-12-2. Position Adjustment of Pinch Solenoid . . . . . 3-16
3-12-3. Position Adjustment of Slack Sensor Operation . . . . . . . . . . 3-16
3-13. Adjustment of Microswitch . . . . . . . . . . 3-17
3-14. Position Adjustment of Microswitch . . . . . . 3-17
3-14-1. Position Adjustment of Miserase Prevention Microswitch . . . . . . . . . . 3-17
3-14-2. Position Adjustment of Threading End Switch 3-17
3-15. Check of Take-up Torque . . . . . . . . . . 3-18
3-16. Check of Cassette Eject Torque . . . . . . . . . 3-18
3-17. Check of Brake Torque . . . . . . . . . . 3-19
3-17-1. Check of Supply and Take-up Brake Operations . . . . . . . . . . 3-19
3-17-2. Check of Supply and Take-up Brake Torque . . 3-19
3-17-3. Check and Adjustment of Soft Brake Torque . 3-20
3-18. Adjustment of FWD Back Tension . . . . . . . 3-20
3-19. Adjustment of Tracking . . . . . . . . . . 3-20
3-19-1. Adjustment of Tape Path . . . . . . . . . . 3-22
3-19-2. Adjustment of Exit Side Tracking after ACE Assembly Replacement . . . . . . . . . . 3-23
3-19-3. Audio Head Azimuth Adjustment . . . . . . . . 3-24
3-19-4. Position Adjustment of ACE Assembly . . . . . 3-24
3-19-5. Video Head Dihedral Adjustment . . . . . . . . 3-24

## 4. ELECTRICAL ALIGNMENT

4-1. Power Supply Alignment and Check . . . . . . 4-2
4-2. System Control Alignment and Check (SY-10 and SY-11 board) . . . . . . . . . . 4-3
4-3. Servo System Alignment . . . . . . . . . . 4-4
4-3-1. Drum Servo System Alignment . . . . . . . . . 4-4
4-3-2. Capstan Servo System Alignment . . . . . . . . 4-5
4-3-3. Slow Speed Circuit Adjustment . . . . . . . . . 4-6
4-4. Video System Alignment (CF-2, YC-12 and RF-2 boards) . . . . . . . . . . 4-6
4-5. Audio System Alignment (AS-3 board) . . . . . 4-12
4-6. Tuner Block System Alignment . . . . . . . . . 4-13
4-7. Timer System Alignment (TM-10 board) . . . . 4-13

# SECTION 1
# PREPARATION FOR MECHANICAL SECTION CHECK, ADJUSTMENT, AND REPLACEMENT

## 1-1. DISASSEMBLY

### 1. Removal and Re-assembly of Cabinet

1. Removal of outer cabinet perform procedures ① to ⑧
2. Note on assembling
   (i) When the upper case with the cassette-up lid is to be attached, attach the upper case while the cassette-up is raised.
   (ii) Attach the cassette-up lid so that the clearance between the cassette-up lid and the upper case is 1 to 2mm.

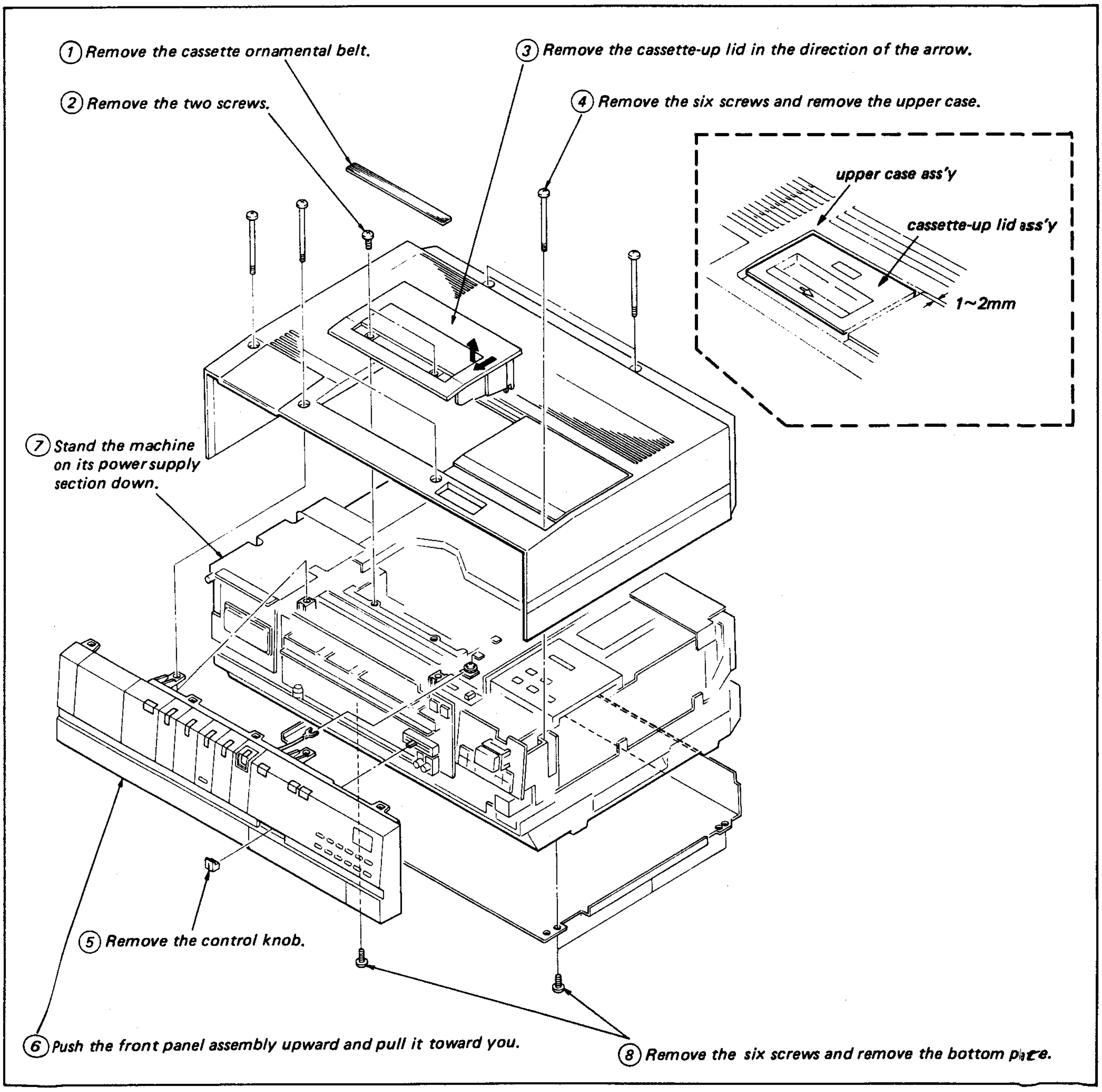
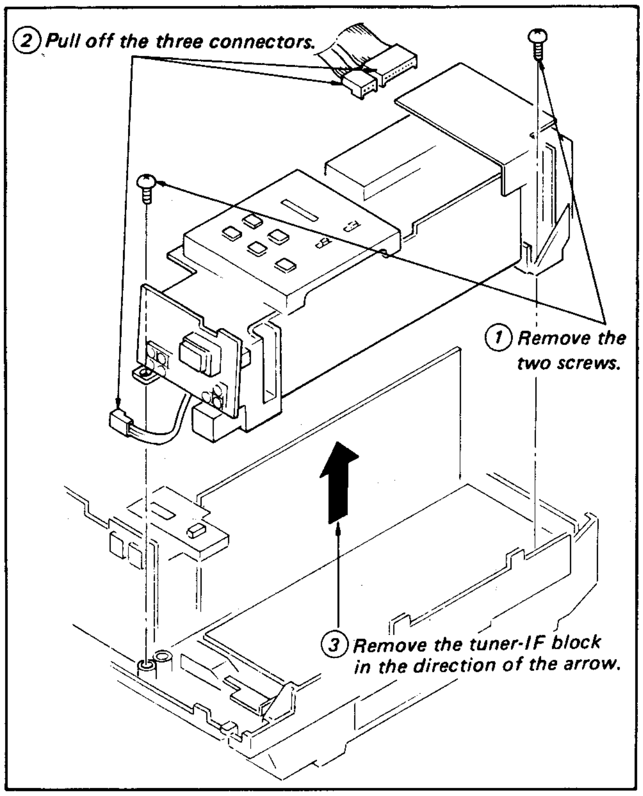

① Remove the cassette ornamental belt.
② Remove the two screws.
③ Remove the cassette-up lid in the direction of the arrow.
④ Remove the six screws and remove the upper case.
upper case ass'y
cassette-up lid ass'y
1~2mm
⑦ Stand the machine on its power supply section down.
⑤ Remove the control knob.
⑥ Push the front panel assembly upward and pull it toward you.
⑧ Remove the six screws and remove the bottom plate.

*Fig. 1-1. Removal and re-assembly of cabinet*

## 2. Tuner-IF Block Removal

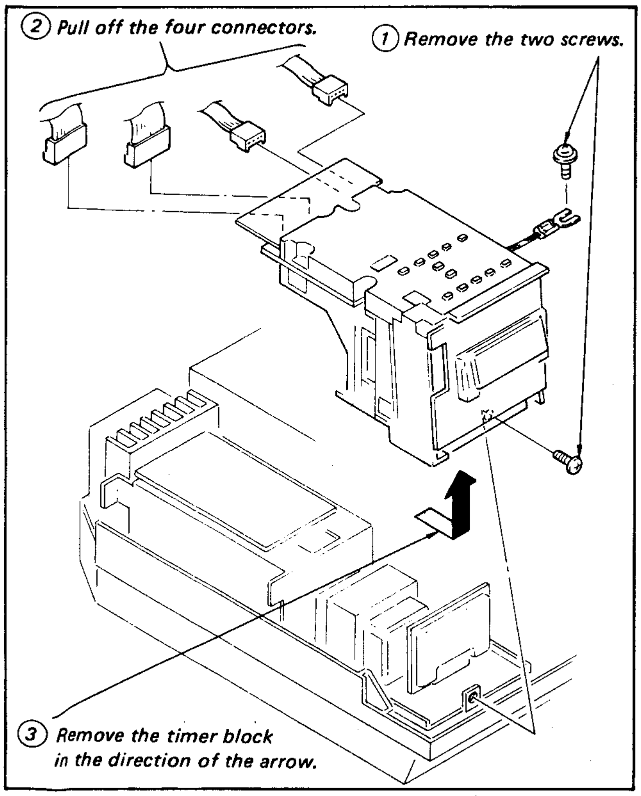

② Pull off the three connectors.

① Remove the two screws.

③ Remove the tuner-IF block in the direction of the arrow.

*Fig. 1-2.*

## 3. Timer Block Removal

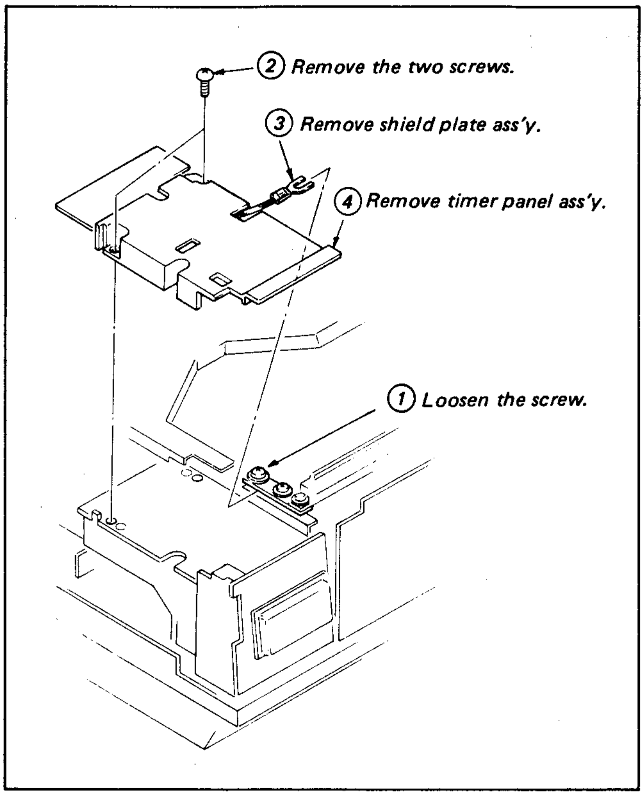

② Pull off the four connectors.

① Remove the two screws.

③ Remove the timer block in the direction of the arrow.

*Fig. 1-3.*

## 4. Timer Panel Removal


② Remove the two screws.

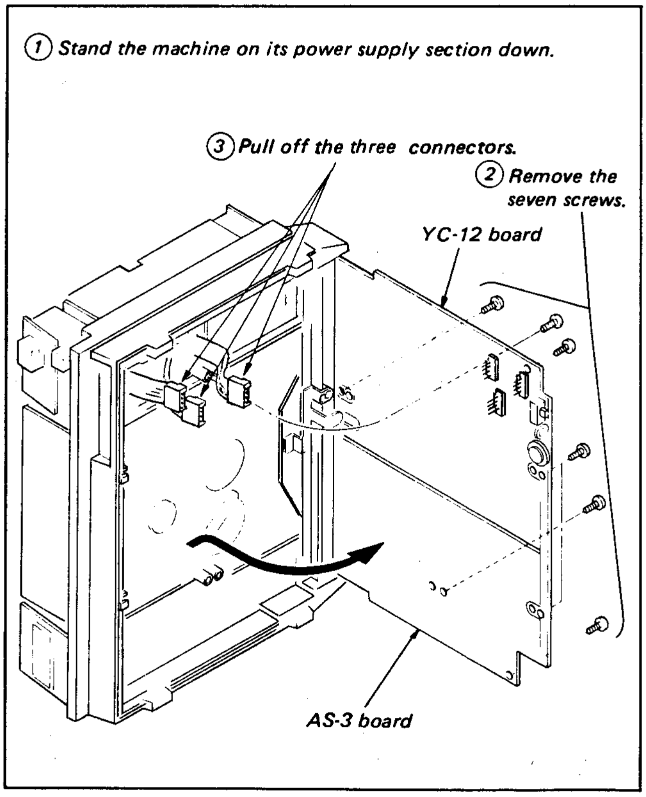
③ Remove shield plate ass'y.

④ Remove timer panel ass'y.

① Loosen the screw.

*Fig. 1-4.*

## 5. Checks of AS-3 and YC-12 Boards


① Stand the machine on its power supply section down.

③ Pull off the three connectors.

② Remove the seven screws.

*Fig. 1-5.*

### 6. Switching Regulator Removal

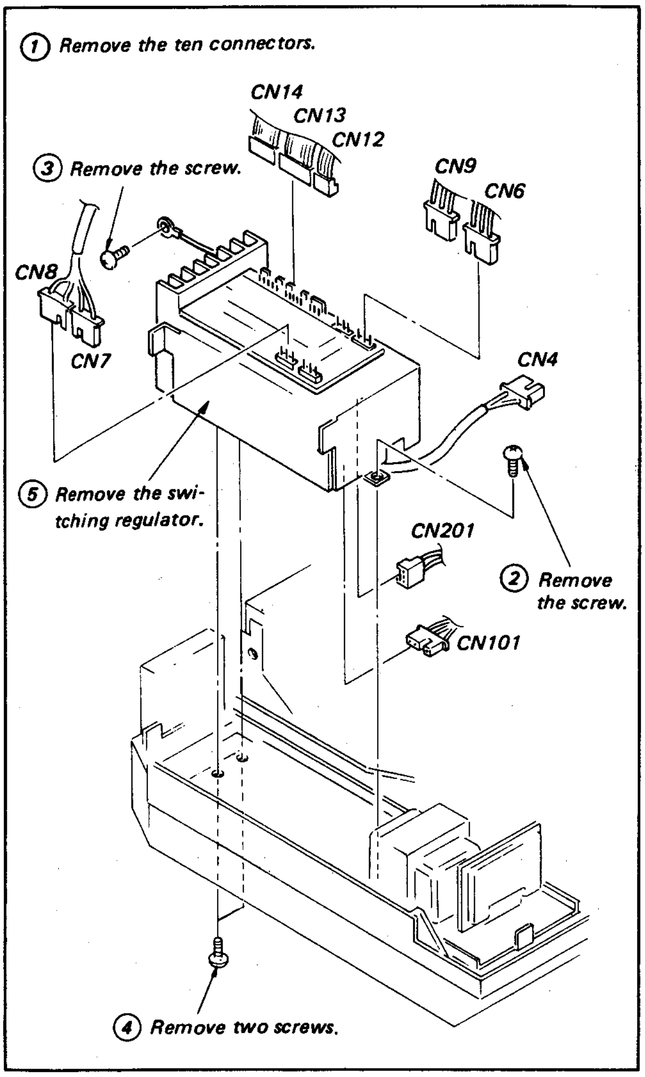

① Remove the ten connectors.
CN14
CN13
CN12
③ Remove the screw.
CN9
CN6
CN8
CN7
CN4
⑤ Remove the switching regulator.
CN201
② Remove the screw.
CN101
④ Remove two screws.

*Fig. 1-6.*

## 1-2. NOTES ON MAINTENANCE

1. Never place the machine upside down when the upper case lid has been removed from the machine, with the fan (black) attached on the drum assembly. (Since the fan projects from the chassis surface, an excessive force is applied on the drum if the machine is placed upside down, which could alter the tape movement and the tape interchangeability.)
2. Be sure to install the fan on the drum prior to the tape playback check or the electrical system alignment. If the check or the alignment is performed without the fan installed, the picture on the monitor may bend, as shown in Fig. 1-5.
3. The KR5-1J alignment tape is effective in making the tape path adjustment easy, as compared with the former alignment tapes.

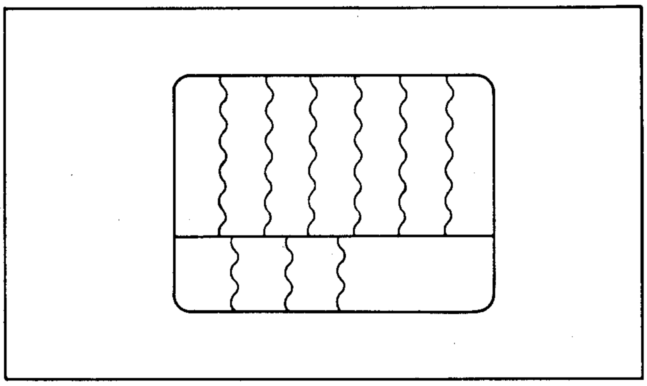


*Fig. 1-7.*

## 1-3. OPERATING RECORDER WITHOUT CASSETTE INSTALLED

1. To Set Up Threading Completion State Without Cassette and Cassette Lift Assembly.
(This state is called "STOP mode" in this guide.)
   - Push down the cassette delection lever until the threading ring stops. (See Fig. 1-6.)

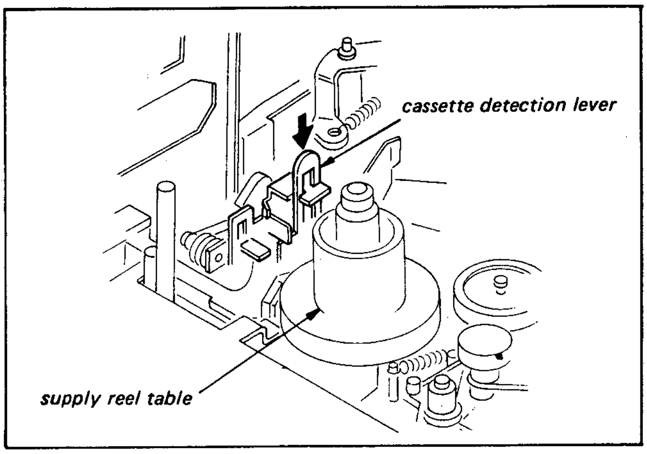

cassette detection lever
supply reel table

*Fig. 1-8.*

2. To Set Up PLAY, FAST FWD, And REWIND States Without Cassette Installed
   - Capture the cassette detection lever with an alligator clip, or an equivalent, as shown in Fig. 1-7, to place the cassette detection switch, mounted on the chassis, into the ON state. Then a desired state of operation can be set up by depressing the function button for the desired state. But note that the PLAY function button must be depressed after performing the procedures for stopping the slack sensor operation described in Section 1-4.

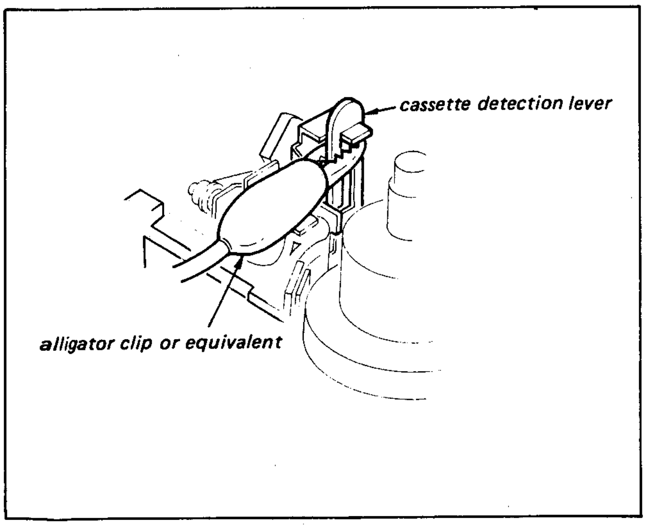

cassette detection lever
alligator clip or equivalent

*Fig. 1-9.*

3. To Set Up EJECT Mode Without a Cassette:

   **Note:** Remove the alligator clip that captured cassette detection lever in Step 2.
   - Keep pressing the EJECT button until the unthreading is completed.
4. To Set Up RECORD Mode Without a Cassette:
   - Capture the cassette detection lever with an alligator clip as shown in Fig. 1-7, manually depress the erasing protection plate as shown in Fig. 1-8, and perform the procedure in Section 1-4, "Stopping Slack Sensor Operation". Then depress the RECORD button or the AUDIO DUB button.

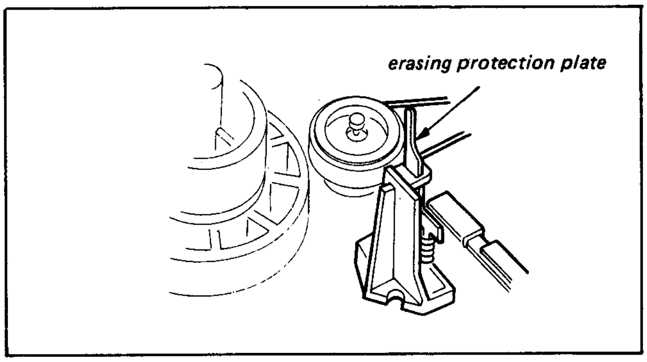

erasing protection plate

*Fig. 1-10.*

## 1-4. STOPPING SLACK SENSOR OPERATION

1. Insert a toothpick, or something like a matchstick whose point is sharpened, into the hole on the CN-6 board as shown in Fig. 1-9 to stop the movement of the slack sensor arm. A plastic pick would be preferred to the wooden one.

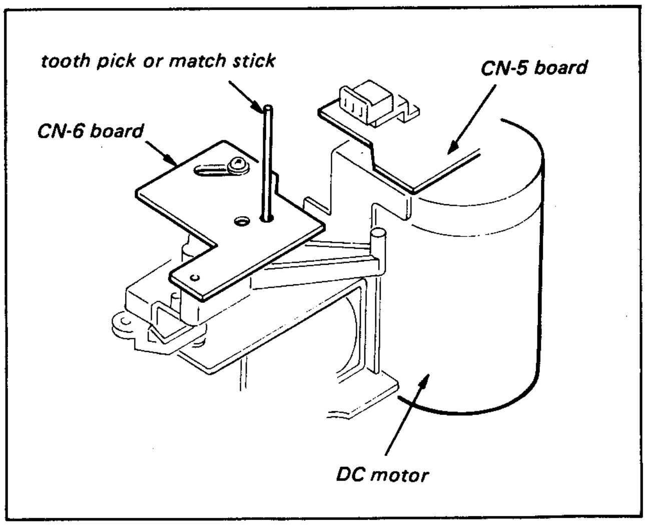

tooth pick or match stick
CN-5 board
CN-6 board
DC motor

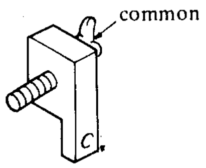
*Fig. 1-11.*

## 1-5. TOOLS AND FIXTURES REQUIRED

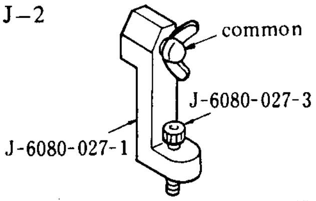
| Ref. No. | Name | Part Code | Carved Jig No. | Use and Remarks |
|---|---|---|---|---|
| J-1 | Upper drum eccentricity adjustment jig | J-6080-027-2 | SL-0027 | Components of the SL-0012 which has been used are utilized as eccentricity adjustment jigs (J-3 and J-4) of the video head disc. |
| J-2 | Upper drum eccentricity adjustment jig | J-6080-027-1<br>J-6080-027-3 | | |
| J-3 | Upper drum eccentricity adjustment jig | J-6080-012-A | SL-0012 | |
| J-4 | Upper drum eccentricity adjustment jig | | | |
| J-5 | Reel table tension gauge | J-6080-011-A | SL-0011 | For torque measurements |
| J-6 | FWD back tension measurement jig | J-6080-002-A | SL-0002 | For FWD back tension measurement |
| J-7 | Sector type gauge (for 50 g) | 7-732-050-20 | — | For back tension and torque measurements |
| J-8 | Sector type gauge (for 100 g) | 7-732-050-30 | — | |
| J-9 | Parallel board | J-608-657-0A | SL-0657 | For zenith adjustment of the audio/CTL head |
| J-10 | Inspection mirror (handle) | 7-723-902-01 | — | For tape path adjustment and tape running check Be sure to place an order for the handle and the mirror as a set. |
| | Inspection mirror (mirror) | 7-723-902-11 | — | |
| J-11 | Dihedral adjustment screw | J-6080-013-1 | SL-0013 | For video head dihedral adjustment |
| J-12 | Alignment tape (KR5-1J) | 8-969-996-03 | — | For over all adjustments such as tracking and picture quality |
| J-13 | Cleaning fluid | Y-2031-001-0 | — | For cleaning |
| J-14 | Chamois | 2-034-697-00 | — | For cleaning |
| J-15 | Thickness gauge | 9-911-053-00 | — | For checking clearance |
| J-16 | Head demagnetizer | Common | — | For video and audio head degaussing (Demagnetizer HE-2 or HE-3) |
| J-17 | Lapping tape | 8-888-004-00 | — | For video head cleaning |

**Note:** When the Jig Nos. J-1 and J-2 are ordered, be sure to place an order for these together as a set.

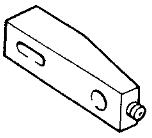
J-1



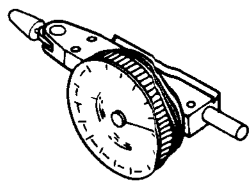
J-2



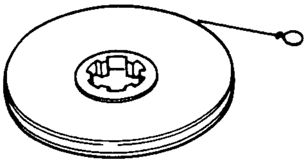
J-3



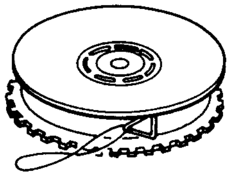
J-4



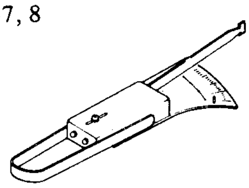
J-5



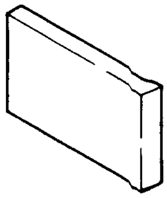
J-6



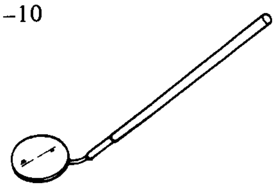
J-7, 8



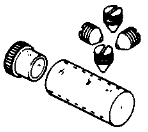
J-9



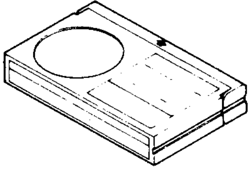
J-10



J-11



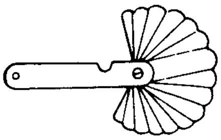
J-12



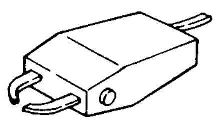
J-13

J-14

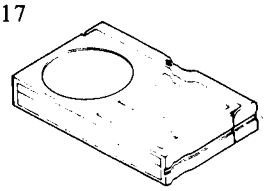
J-15



J-16



J-17



# SECTION 2
# PERIODIC CHECK AND MAINTENANCE

- It is recommended that the following periodic check and maintenance be performed for obtaining the full function and performance of the machine and extending the lives of the machine and tape.

## 2-1. MAINTENANCE AFTER REPAIR

The following maintenance items must be performed after repair of the machine without regard to the operating hours of the machine.

(1) Cleaning of the video head disk assembly
- Press chamois saturated with the cleaning fluid or isopropyl alcohol lightly on the video head disk assembly and turn the fan on the drum slowly by hand for cleaning. (Never try to clean the video head disk assembly with the motor running.)
- Never move the chamois vertically against the head tips for cleaning, or the head tips will be damaged.

(2) Cleaning of the tape movement system
- Clean the surfaces which the tape contacts during its movement (the tape guides, drum assembly, capstan, and pinch roller) with chamois saturated with the cleaning fluid or isopropyl alcohol.

(3) Cleaning of the driving system
- Clean the driving elements (such as belts, idlers, and reel table surfaces) with a piece of cloth saturated with the cleaning fluid or isopropyl alcohol.

## 2-2. PERIODIC CHECK ITEMS

Perform the maintenance and check listed on the table below, according to user's operating hours.

○ Cleaning ◎ Lubrication ★ Replacement ☆ Confirmation

| Maintenance & Check | | Operating Hour (H)<br>Replacement Part No. | 500 | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 | 3,500 | 4,000 | 4,500 | 5,000 | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tape Movement System | Cleaning of tape movement system | ——— | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | This cleaning must be done whenever a repair is made. |
| | Cleaning & degaussing of ACE ass'y | ——— | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| | Cleaning, degaussing & replacement of video head disk ass'y | A-6762-038-A | ○ | ★ | ○ | ★ | ○ | ★ | ○ | ★ | ○ | ★ | The life of a head varies, depending on operational conditions and methods. |
| Driving System | Lubrication to thrust retainer | ——— | — | ◎ | — | ◎ | — | ◎ | — | ◎ | — | ◎ | Apply a drop of oil (such as sewing machine oil) on each of upper and lower bearings. |
| | Lubrication to thrust bearing (under reel table) | ——— | — | — | ◎ | — | — | ◎ | — | — | ◎ | — | Remove reel table and apply a drop of oil (such as sewing machine oil) on thrust bearing. |
| | Cleaning & replacement of capstan belt | 3-659-351-00 | ○ | ○ | ★ | ○ | ○ | ★ | ○ | ○ | ★ | ○ | •Cleaning must be done whenever repair is made.<br>•Replacement must be done depending on operating hours on the table, or every two years. |
| | Cleaning & replacement of belts other than capstan belt | ——— | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ★ | ○ | ○ | |
| | Replacement of FWD limiter | X-3653-310-0 | — | — | ★ | — | — | ★ | — | — | ★ | — | |
| | Cleaning of iron core and opening of solenoid | ——— | — | — | — | ○ | — | — | — | ○ | — | — | Wipe iron core and opening of solenoids with a dry cloth. |
| Performance Confirmation | Abnormal sound | ——— | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ | Adjust or replace the section which makes abnormal sound. |
| | Measurement of FWD back tension | ——— | — | ☆ | — | ☆ | — | ☆ | — | ☆ | — | ☆ | Confirmation must be made according to Section 3-18. Specified value: 35 to 45g. (when measured with jig tape) |
| | Confirmation of brake system | ——— | — | ☆ | — | ☆ | — | ☆ | — | ☆ | — | ☆ | Confirmation must be made according to Section 3-17. |
| | Confirmation of record & playback functions | ——— | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ | ☆ | Perform the confirmation whenever repair is made. |

- Belts other than capstan belt

FWD belt : 3-653-324-00
Threading belt : 3-659-301-00
EJECT belt : 3-659-397-00
FF belt : 3-659-471-00
Counter belt : 3-659-485-00

**(Note** on Overhaul)

A part replacement must be done in the overhal operation, refering to the listed items. The replacement periods of the motor and the head which are not included in the chart items are as follows.

Full erase head . . . . . about 4,000 operating hou
Capstan motor . . . . . about 2,000 operating hou

## 2-3. OTHERS

(1) Lubricating Oil

- Be careful in applying oil to any parts.
  Do not permit the oil to coat any surface that is touched by the tape, heads, or drive belts.

- Be sure to use SONY oil (or equivalent) for lubrication. (Various troubles will be caused, if a different viscosity oil is used.)

  SONY Oil: Part No. 7-661-018-01
  (Mitsubishi Diamond Oil #440)
  OR THE EQUIVALENT OF SEWING MACHINE TYPE OIL

- Use the oil without dust or other foreign material for the bearing lubrication. (If an oil including dust and others is used, friction and burning of the bearing are apt to occur)

- The quantity of "a drop of oil" is about the quantity that will attach to the tip of a 2 mm diameter stick, as shown in the figure.

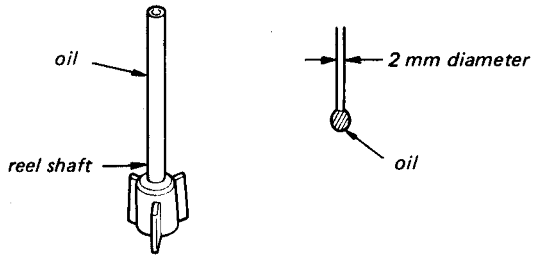


*Fig. 2-1.*

# SECTION 3
# CHECK, ADJUSTMENT, AND REPLACEMENT PROCEDURES

## 3-1. REPLACEMENT OF VIDEO HEAD DISK ASSEMBLY AND ECCENTRICITY ADJUSTMENT

1. Remove the video head disk assembly, following Steps ① to ⑥ shown in Fig. 3-1.

**Note:**
- For removing fan ①, hold video head disk assembly ⑥ (without touching heads) and turn the fan in a counterclockwise direction.
- Never loosen the two setscrews that fasten the lower flange to the drum shaft.
- Never loosen the lower two screws of the drum support.
- Prior to installing the video head disk assembly ⑥, clean surfaces Ⓐ and Ⓑ with a piece of cloth saturated with methanol or isopropyl alcohol.

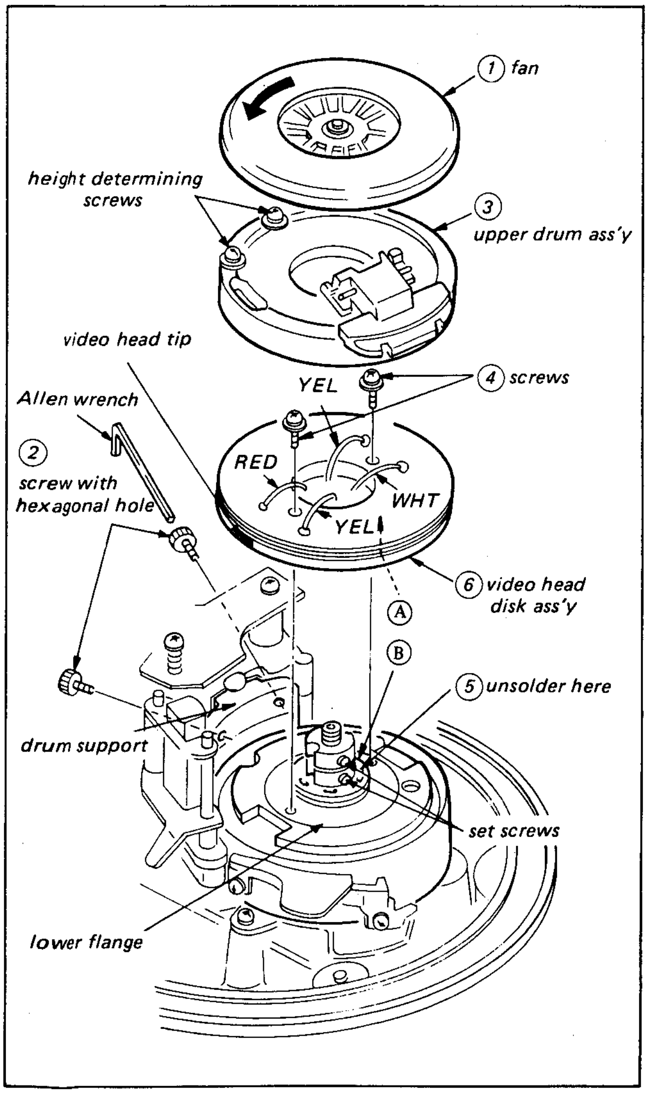
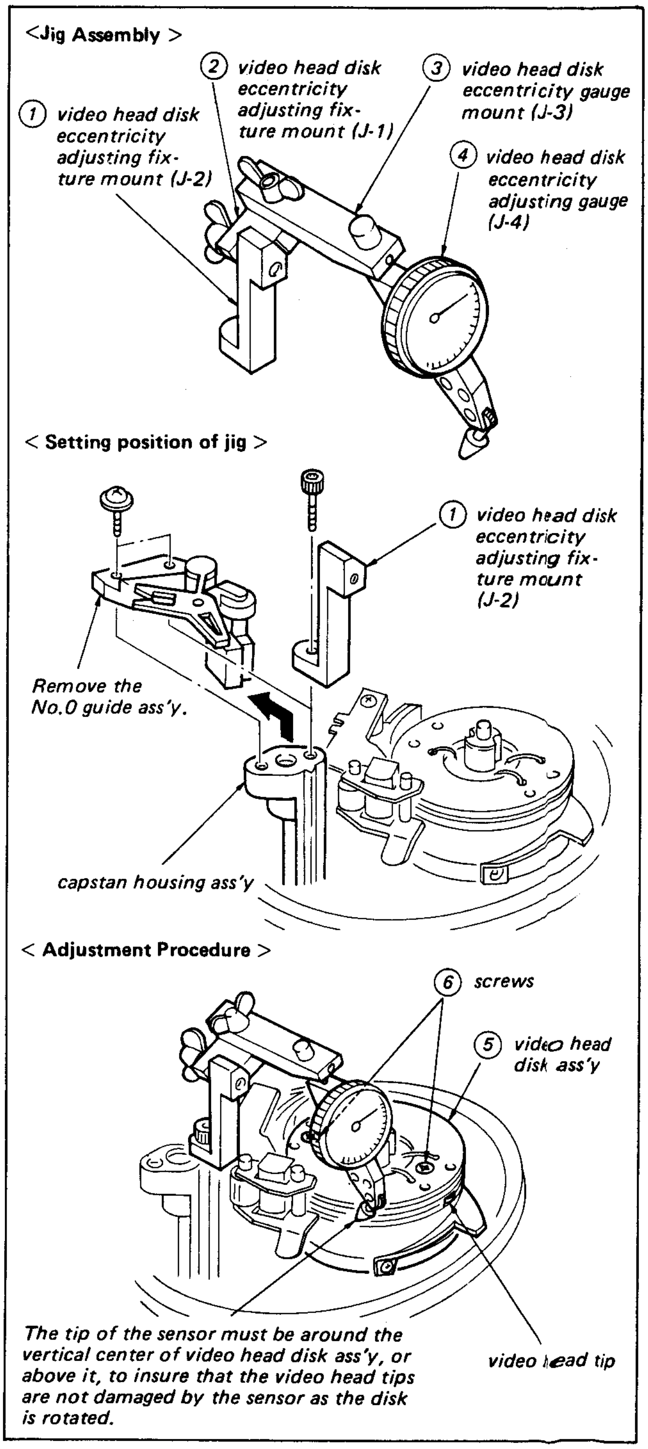

① fan
height determining screws
③ upper drum ass'y
video head tip
Allen wrench
② screw with hexagonal hole
YEL
④ screws
RED
WHT
YEL
⑥ video head disk ass'y
Ⓐ
Ⓑ
⑤ unsolder here
drum support
set screws
lower flange

*Fig. 3-1. Replacement of the video head disk assembly*

2. Install the video head disk assembly tentatively (with two screws only finger-tight) and perform the eccentricity adjustment.

   (i) Combine adjusting fixture parts ①, ②, ③, and ④ as shown in Fig. 3-2. Set the combined fixture on the machine by mounting the eccentricity gauge assembly in the capstan husing assembly. See Fig. 3-2.


<Jig Assembly >
② video head disk eccentricity adjusting fixture mount (J-1)
③ video head disk eccentricity gauge mount (J-3)
① video head disk eccentricity adjusting fixture mount (J-2)
④ video head disk eccentricity adjusting gauge (J-4)
< Setting position of jig >
① video head disk eccentricity adjusting fixture mount (J-2)
Remove the No.0 guide ass'y.
capstan housing ass'y
< Adjustment Procedure >
⑥ screws
⑤ video head disk ass'y
video head tip

*The tip of the sensor must be around the vertical center of video head disk ass'y, or above it, to insure that the video head tips are not damaged by the sensor as the disk is rotated.*

*Fig. 3-2. Eccentricity adjustment of the video head disk assembly*

(ii) Turn the shaft of the drum counterclockwise slowly with the fingers and adjust the video head disk position so that the variation in the reading of the drum eccentricity adjusting gauge is within 5 $\mu$m during each turn of the drum, by very gently tapping a screwdriver whose blade-tip is against the inner circumference of video head disk assembly ⑤.

(iii) Tighten the screws ⑥ that secure the video head disk assembly ⑤ alternately and gradually after the eccentricity adjustment is completed. (tightening torque: more than 10 kg.cm.)

(iv) After the screws are tightened, confirm again that the eccentricity deflection is within 5 $\mu$m.

(v) Solder the four leads of the head and remount the upper drum assembly while holding the upper drum height determining screws. (See Fig. 3-1.)

3. Perform the following adjustments after the replacement of the video head disk assembly.

| | |
|---|---|
| 3-11-6. | No. 0 guide section assembly adjustment |
| 3-19-1. | Tape path adjustment |
| 3-19-4. | ACE assembly position adjustment |
| 3-19-5. | Video head dihedral adjustment |
| 4-3-1.–2. | RF switching position adjustment |
| 4-3-1.–3. | REC mode servo lock phase adjustment |
| 4-4-2. | Playback amplifier frequency characteristic adjustment (RF-2 board) |
| 4-4-1. | Y-FM record current adjustment (RF-2 board) |
| 4-4-16. | Chroma record current adjustment (YC-12 board) |

## 3-2. REPLACEMENT OF DRUM ASSEMBLY

1. **Stand the machine on its left side. Open the YC-12 and AS-3** boards. (Refer to Section 1-1-4.)
2. Remove FF belt ① and drum shield ② shown in Fig. 3-3.
3. Remove two screws ① and connectors ② and ③ shown in Fig. 3-4. The drum assembly can then be removed, by pulling it up.
4. Loosen the rotor assembly by inserting a long-nose pliers or a screwdriver into the two rotor holes shown in Fig. 3-5 and removing the N5$\phi$ nut and SW5$\phi$ washer. Pull off the rotor assembly.
5. Remove the screw mounting the stator assembly (shown in Fig. 3-5) and pull off the stator assembly.
6. Install the rotor assembly and the stator assembly (removed in Steps 4 and 5) onto the new drum assembly.

**Note:** Install the stator assembly so that the 3P connector on the stator assembly fits into the slot of the shield case assembly.

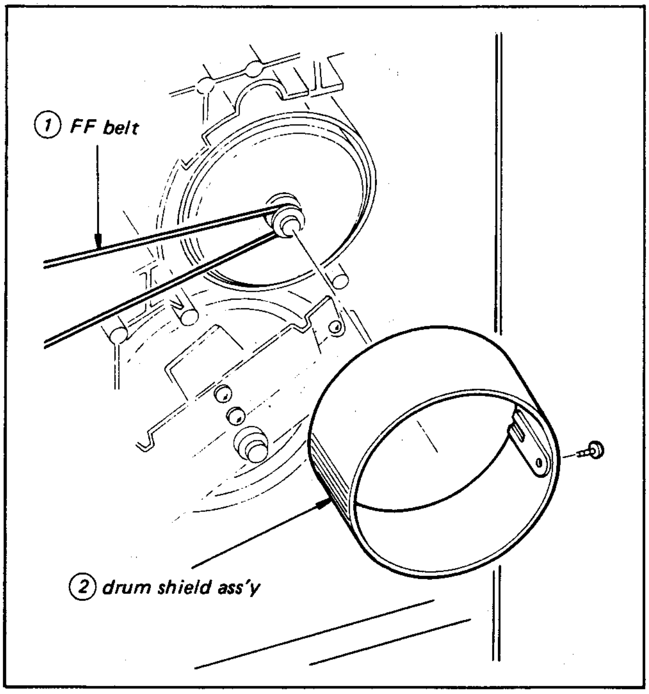


*Fig. 3-3. Replacement of drum assembly (1)*

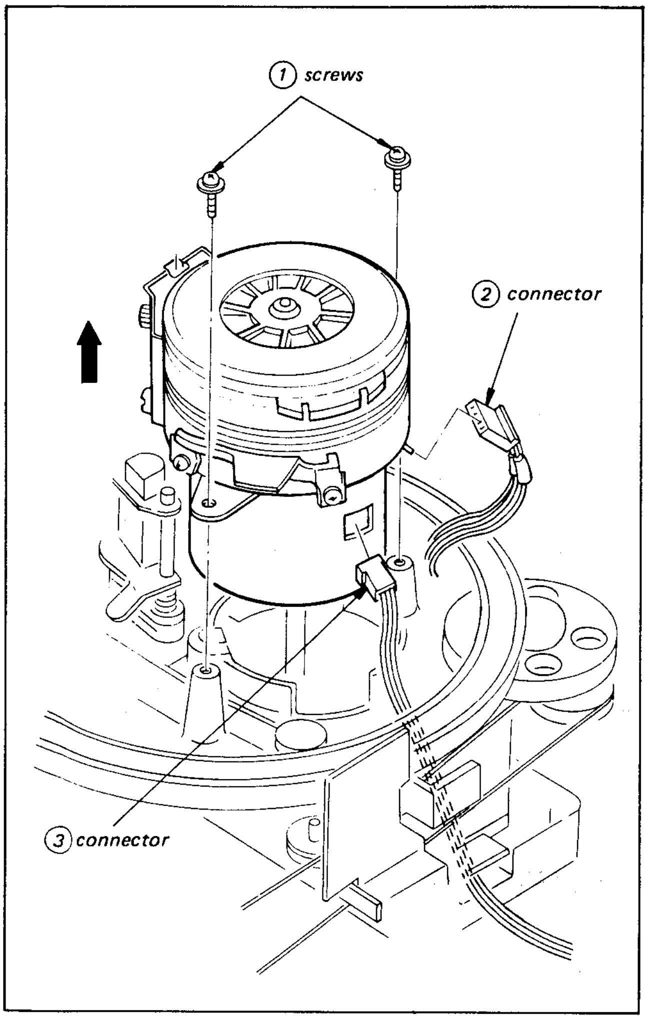

① screws
② connector
③ connector

*Fig. 3-4. Replacement of drum assembly (2)*

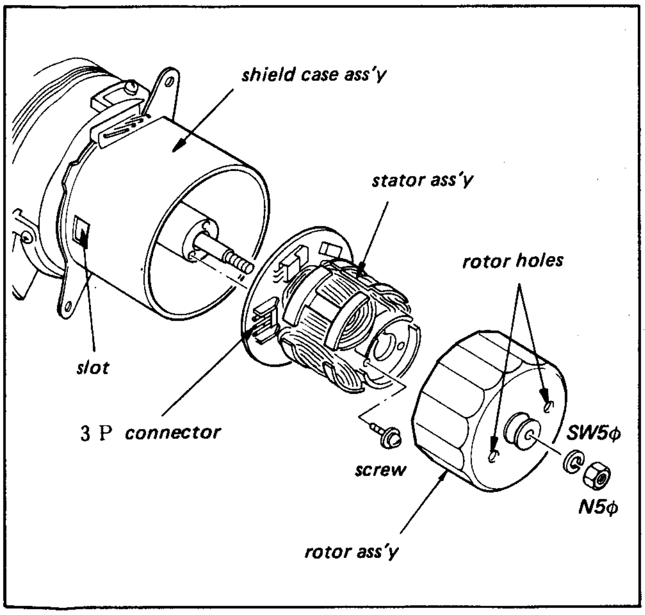

shield case ass'y
stator ass'y
rotor holes
slot
3 P connector
screw
SW5ϕ
N5ϕ
rotor ass'y

*Fig. 3-5. Replacement of drum assembly (3)*

7. Install two connectors, the drum shield assembly, and the FF belt on the drum assembly.

**Note:** 1. The bottom edge of the drum shield must be flush with the bottom edge of the shield base assembly.

2. Do not tighten the drum shield set screw too much or housing will distort.

Pull the leads of connector Ⓐ in the arrow direction and dress the leads so that the leads do not touch the EJECT belt. (See Fig. 3-6.)

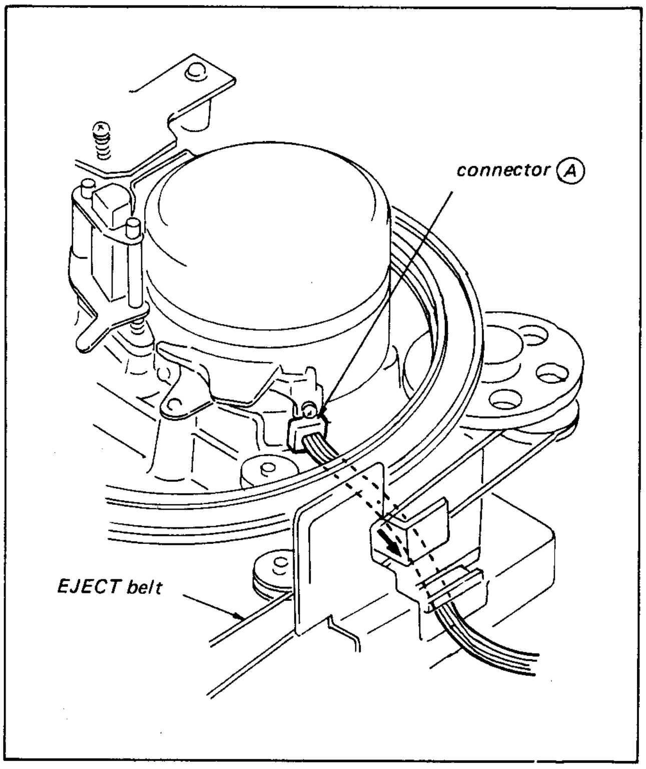

connector Ⓐ
EJECT belt

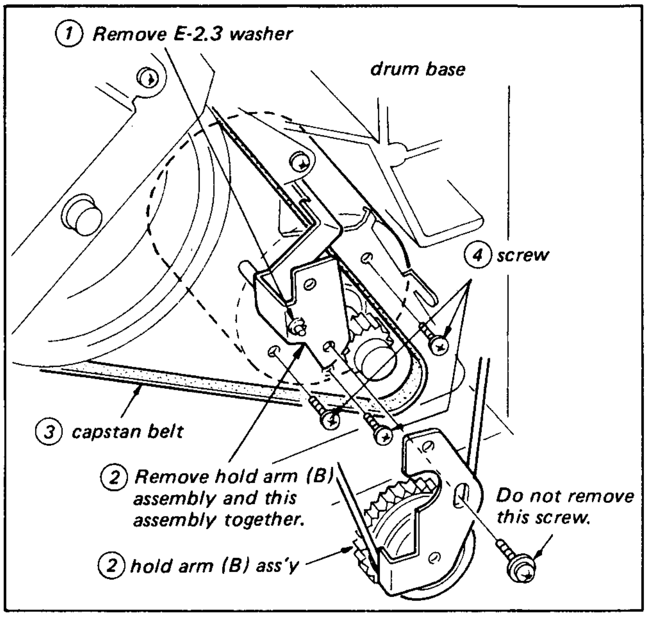
*Fig. 3-6. Replacement of drum assembly (4)*

8. Perform the following adjustments after the replacement.

| | |
|---|---|
| 3-19-1. | Tape path adjustment |
| 3-19-4. | ACE assembly position adjustment |
| 4-3-1. | Drum servo system adjustment |
| 4-4-2. | Playback amplifier frequency characteristic adjustment (RF-2 board) |
| 4-4-1. | Y-FM record current adjustment (RF-2 board) |
| 4-4-16. | Chroma record current adjustment (YC-12 board) |

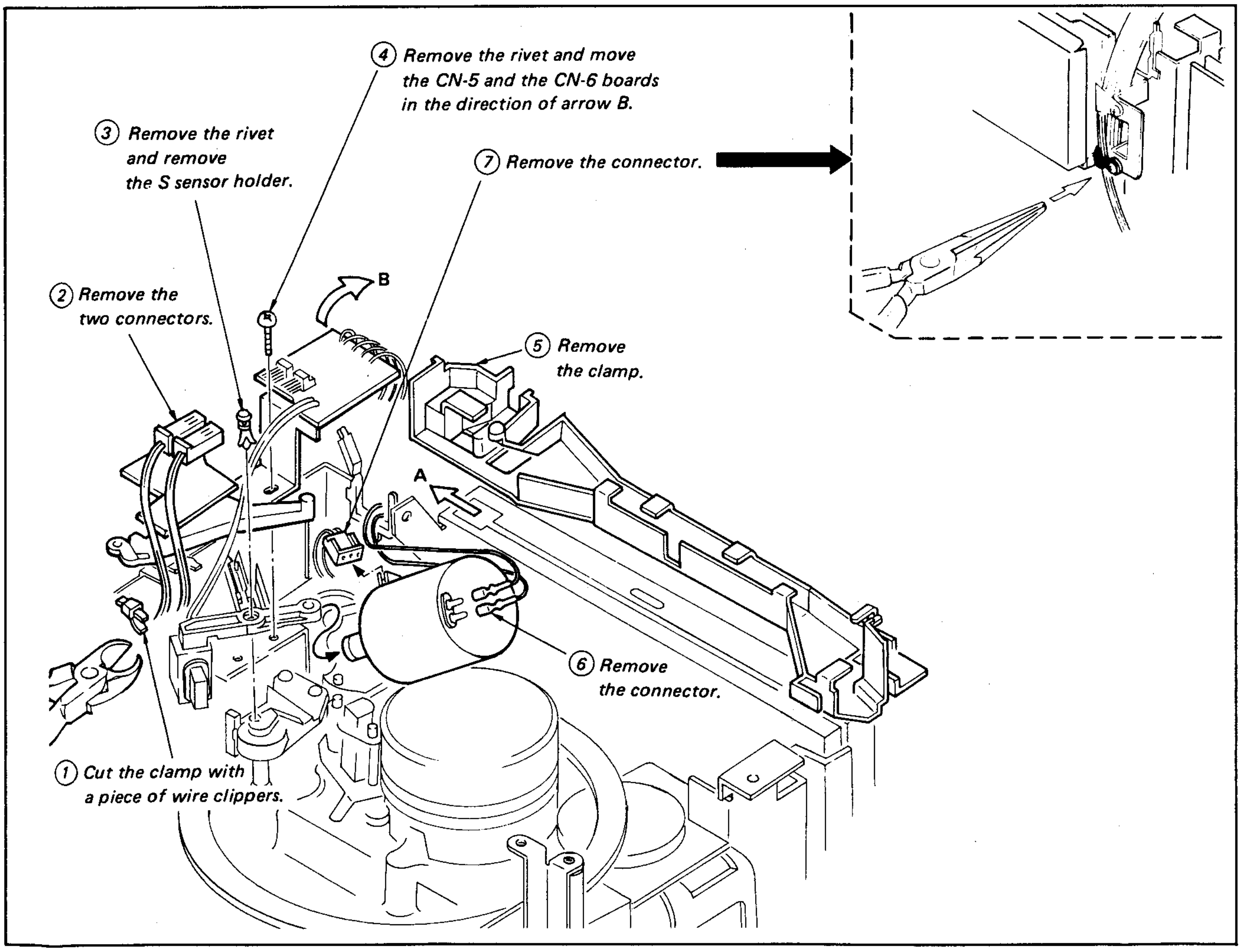
## 3-3. REPLACEMENT OF CAPSTAN DC MOTOR

1. Stand the machine on its left side. Open the YC-12 and the AS-3 boards. (Refer to Section 1-1-4.)
2. Remove the DC motor from the drum base, following Steps ① to ④ shown in Fig. 3-7.
3. Take out the DC motor, following Steps ① to ⑦ shown in Fig. 3-8.



① Remove E-2.3 washer
drum base
④ screw
③ capstan belt
② Remove hold arm (B) assembly and this assembly together.
Do not remove this screw.
② hold arm (B) ass'y

*Fig. 3-7. Replacement of DC motor (1)*



④ Remove the rivet and move the CN-5 and the CN-6 boards in the direction of arrow B.
③ Remove the rivet and remove the S sensor holder.
⑦ Remove the connector.
B
② Remove the two connectors.
⑤ Remove the clamp.
A
⑥ Remove the connector.
① Cut the clamp with a piece of wire clippers.

*Fig. 3-8. Replacement of DC motor (2)*

4. Remove capstan shield ① and motor pulley assembly ② from the defective motor and install them on the replacement motor. (See Fig. 3-9.)

**Note:** Install motor pulley assembly ② so that there is a clearance of approx. 1.5 mm between the motor pulley assembly and capstan motor ③.

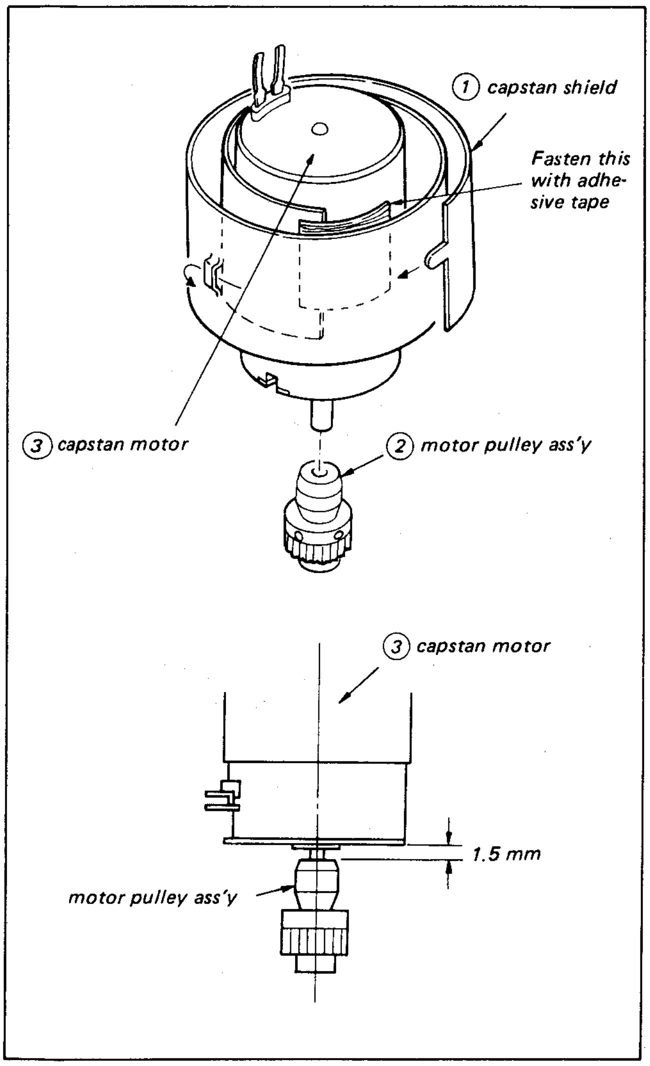

① capstan shield
Fasten this with adhesive tape
③ capstan motor
② motor pulley ass'y
③ capstan motor
1.5 mm
motor pulley ass'y

*Fig. 3-9. Replacement of DC motor (3)*

5. Perform the following adjustment after the replacement.

   4-3-2.–1. Capstan free speed adjustment

## 3-4. REPLACEMENT AND ADJUSTMENT OF TENSION REGULATOR ARM PLATE ASSEMBLY AND TENSION REGULATOR BAND ASSEMBLY

The tension regulator arm replacement must be done carefully, following the procedure below, because the tape interchangeability is much affected by the tension regulator arm operation.

### 3-4-1. When Tension Regulator Band Assembly is Replaced;

1. The tension regulator band assembly can be removed after removing screw ① and hook ② shown in Fig. 3-10.
2. Perform the tension regulator FWD position adjustment described below after the replacement.
   - (i) Place the machine, without an inserted cassette, into the STOP mode. (Refer to Section 1-3.)
   - (ii) Set up the PLAY mode.
   - (iii) Move the tention regulator band assembly ③ in the arrow direction as shown in Fig. 3-10 so that the positional relationship of the brake band assembly is as shown Ⓐ in Fig. 3-10. Then tighten screw ① .
   - (iv) Perform the FWD back tension adjustment, Section 3-18, after the replacement.

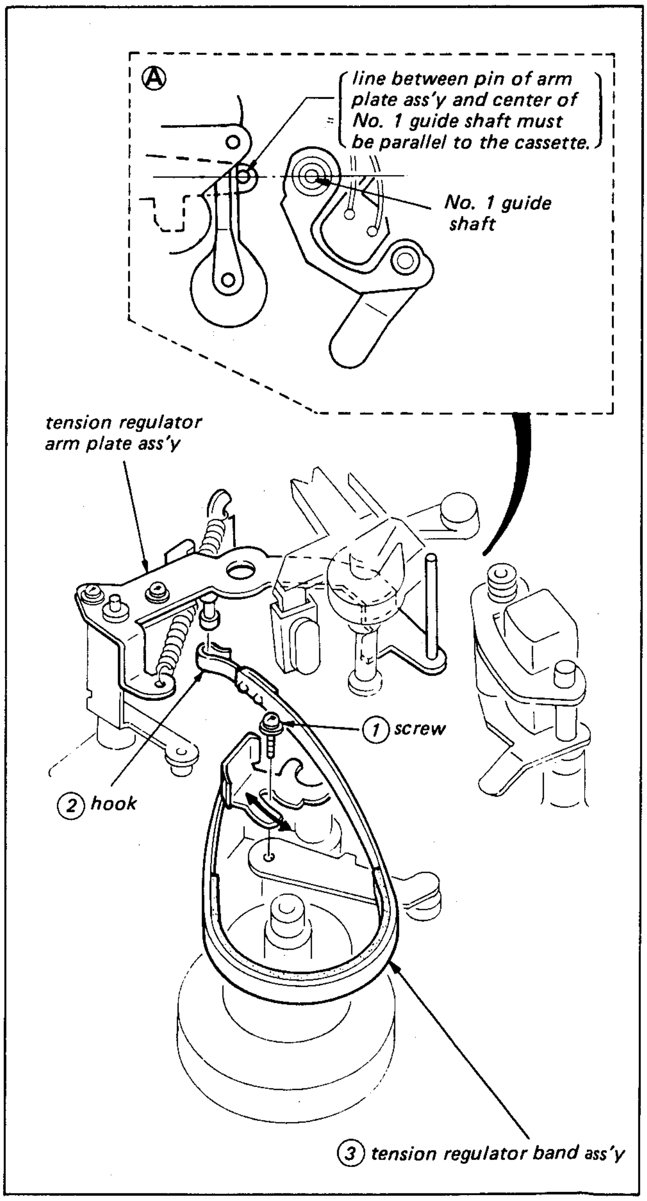

Ⓐ
line between pin of arm plate ass'y and center of No. 1 guide shaft must be parallel to the cassette.
No. 1 guide shaft
tension regulator arm plate ass'y
① screw
② hook
③ tension regulator band ass'y

*Fig. 3-10. Replacement and adjustment of the tension regulator band assembly*

### 3-4-2. When Tension Regulator Arm Plate is Replaced:

1. The tension regulator arm plate can be removed after removing two screws② and spring③ shown in Fig. 3-11.
2. After the replacement, perform the tension regulator FWD position adjustment as follows.
   - (i) Set up the STOP mode without an installed cassette. (Refer to Section 1-3.)
   - (ii) Set up the PLAY mode.
   - (iii) Loosen screw ⑤ that mounts tension regulator band assembly ④ as shown in Fig. 3-11. Move tension regulator band assembly ④ in the arrow direction, and tighten screw ⑤ tentatively when the condition shown in Ⓐ is set up.
   - (iv) Insert a standard blade-tip screwdriver into section Ⓑ, adjust the clearance between release link (1) assembly ⑥ and tension regulator arm assembly ⑦, shown in Fig. 3-11, to be 2 to 2.5 mm, and tighten screw ②.
   - (v) Repeat Steps (iii) and (iv) again and tighten screws② and⑤.
   - (vi) After the completion of the above steps, perform the FWD back tension adjustment, Section 3-18.

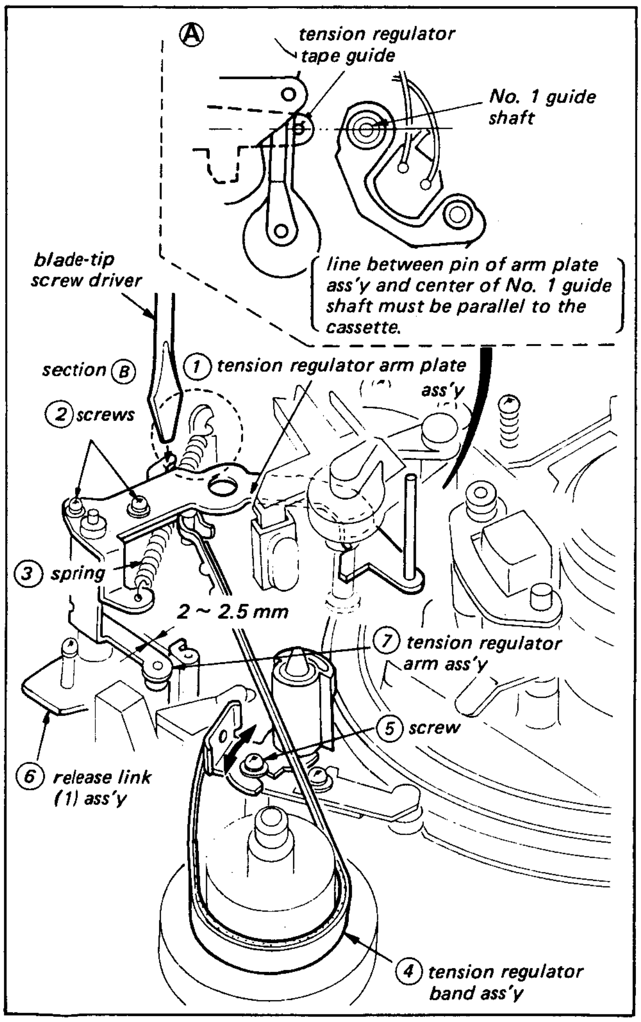

Ⓐ
tension regulator tape guide
No. 1 guide shaft
line between pin of arm plate ass'y and center of No. 1 guide shaft must be parallel to the cassette.
blade-tip screw driver
section Ⓑ
② screws
① tension regulator arm plate ass'y
③ spring
2 ~ 2.5 mm
⑦ tension regulator arm ass'y
⑤ screw
⑥ release link (1) ass'y
④ tension regulator band ass'y

*Fig. 3-11. Replacement and adjustment (1) of tension regulator arm plate assembly*

3. Play back the 1 MHz segment of the alignment tape (KR5-1J). Loosen the lock screw and adjust screw "A" in Fig. 3-12 so that the RF waveform becomes that (see the waveform in the tape path adjustment, Section 3-19-1.) when the TRACKING knob is turned to the right and left from its center detent position and so that the tape is not apart from the flanges of guides ①, ② and ③ shown in Fig. 3-12 and there is not a large tape curl at the guides.

**Note:** Do not turn screw "A" to the right and left more than 90 degrees from its initial position.

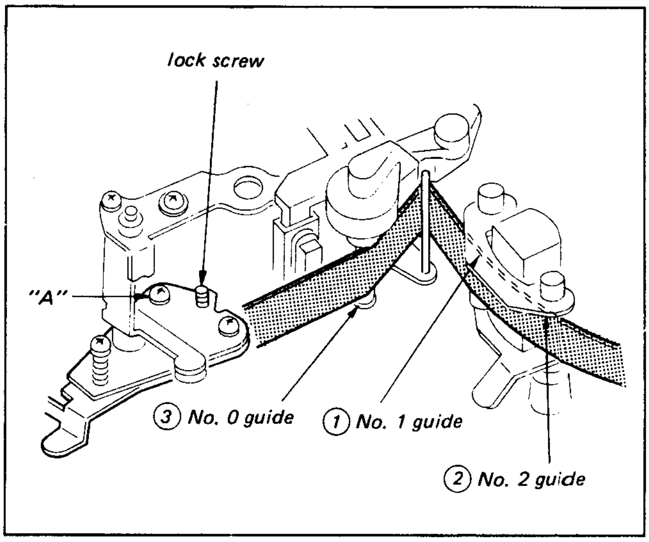

lock screw
"A"
③ No. 0 guide
① No. 1 guide
② No. 2 guide

*Fig. 3-12. Replacement and adjustment (2) of tension regulator arm plate assembly*

4. Confirm that there is not a large bending of the tape at each of the tension regulator guide pin section and the No. 0 guide section shown in Fig. 3-13 after the completion of the adjustment. If the bending is found, repeat Step 3.

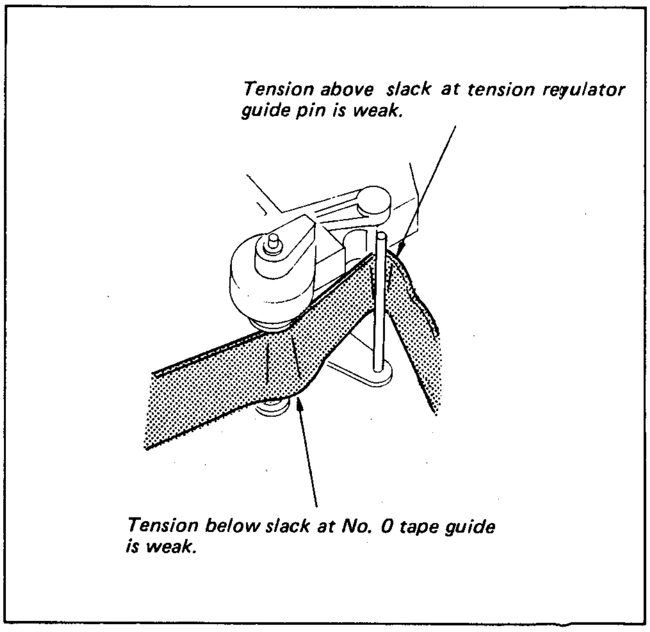

Tension above slack at tension regulator guide pin is weak.
Tension below slack at No. 0 tape guide is weak.

*Fig. 3-13. Replacement and adjustment (3) of tension regulator arm plate assembly*

## 3-5. REPLACEMENT OF CASSETTE-LIFT ASSEMBLY

1. Set up the unthreading state and remove the cassette-lift assembly by loosening four screws.
2. Install the cassette-lift assembly so that the reel tables and the reel holes on the cassette holder from concentric circles. (See Fig. 3-14.)
3. Insert the cassette into the cassette-lift compartment after the installation, set up the EJECT mode to perform unthreading after setting up the STOP mode, and confirm that the cassette-lift compartment assembly lifts. Make the confirmation after performing the lid opener position adjustment in Section 3-10.

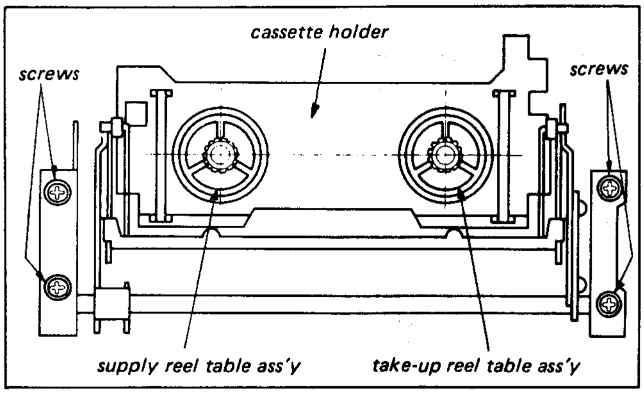

cassette holder
screws
screws
supply reel table ass'y
take-up reel table ass'y

*Fig. 3-14. Replacement of cassette-lift assembly*

## 3-6. ADJUSTMENT OF REEL TABLE HEIGHT

- Since the reel table height serves as the reference of the tape movement system, the height must be adjusted caerfully after the reel table replacement.

1. Measure the height of the reel table with a slide caliper prior to the removal of the old reel table. (See Fig. 3-15.)
2. Place a new reel table, measure its height, and adjust height by adding or removing the adjusting spacer so that the difference in the heights of the former and new reel tables is within 0.1mm. (See Fig. 3-15.)

## 3-7. POSITION ADJUSTMENT, PAUSE SOLENOID

1. **Set up the STOP mode without the cassette installed. (Refer to Section 1-3.)**
2. **Set up the REC PAUSE state so as to place the solenoid into the energized state.**
3. **Loosen the screws ① that mount the solenoid and move the solenoid in the direction indicated by screw Ⓐ as shown in Fig. 3-16 so that a clearance is made between the brake rubber and the take-up reel table.**
4. **Then move the solenoid in the direction shown by arrow Ⓑ and tighten screws ① after the solenoid is moved further 0.1–0.4 mm in the Ⓑ arrow direction from the point where the brake rubber begins to touch the take-up reel table assembly.**

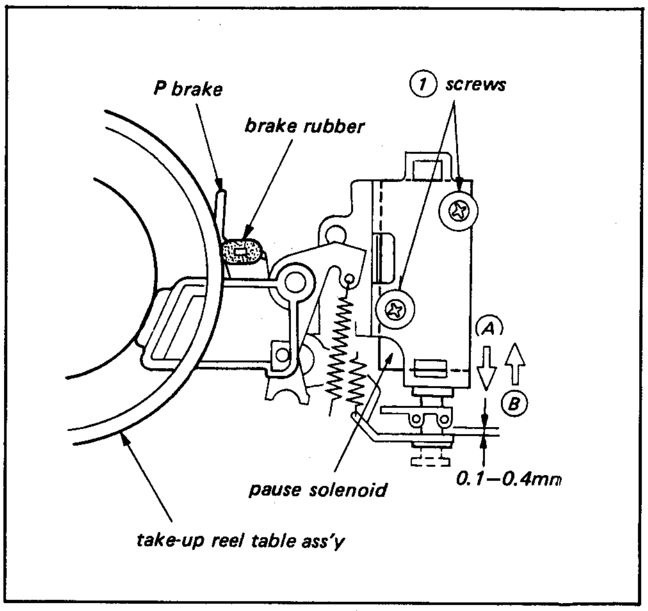

P brake
① screws
brake rubber
Ⓐ
Ⓑ
pause solenoid
0.1–0.4mm
take-up reel table ass'y

*Fig. 3-16. Position adjustment of pause solenoid (Stroke adjustment)*

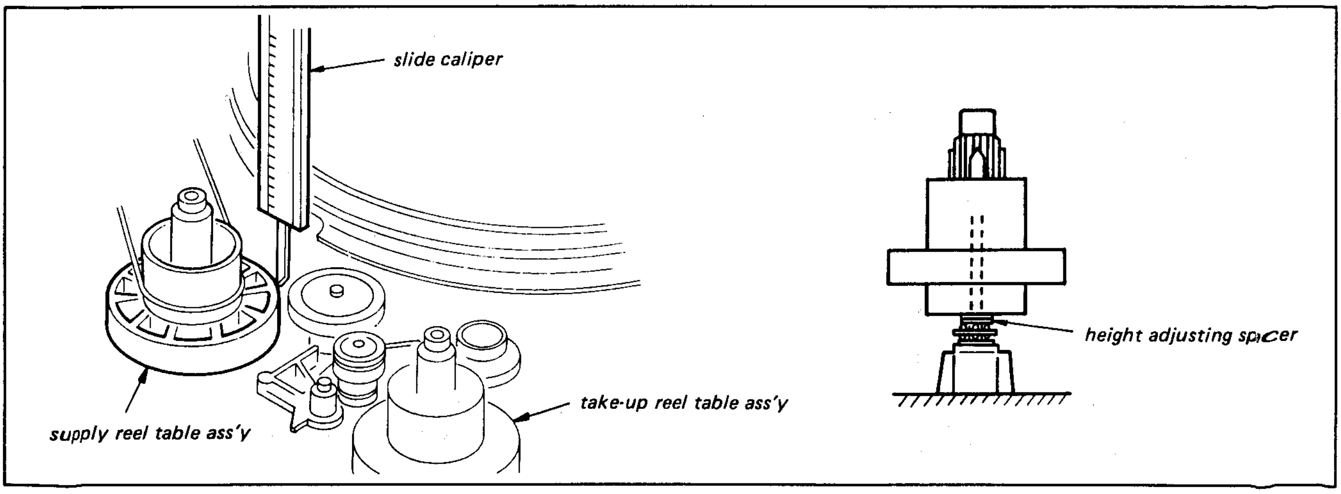

slide caliper
height adjusting spacer
take-up reel table ass'y
supply reel table ass'y

*Fig. 3-15. Adjustment of reel table height*

## 3-8. POSITION ADJUSTMENT OF FUNCTION SOLENOID

### 3-8-1. Position Adjustment of PLAY, F. FWD and REW Solenoids

The four solenoids shown in Fig. 3-17 require careful adjustments because these solenoids are the driving force for the PLAY, F. FWD, and other tape operations. (As to the position adjustment of the EJECT solenoid, refer to Section 3-8-2.)

1. Set up the STOP mode without the cassette. (See Section 1-3.)
2. Remove the two screws fixing the SY-10 board and open the board in the direction of the arrow.

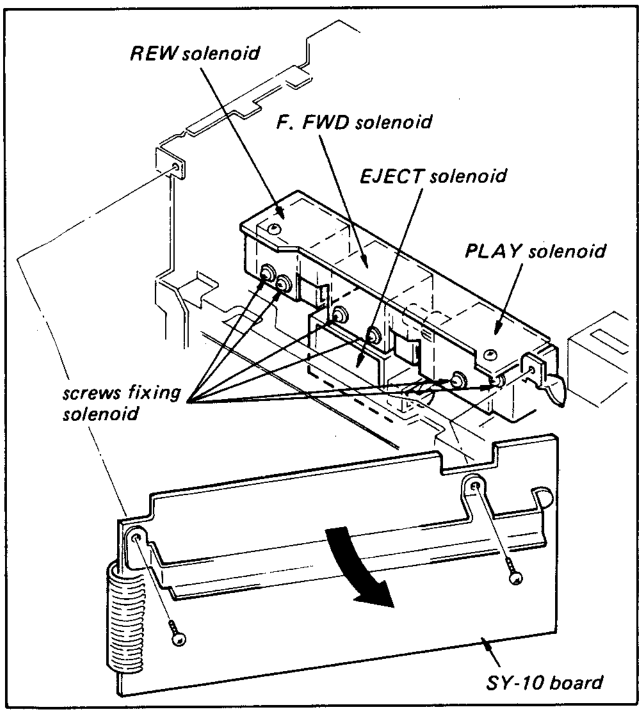

REW solenoid
F. FWD solenoid
EJECT solenoid
PLAY solenoid
screws fixing solenoid
SY-10 board

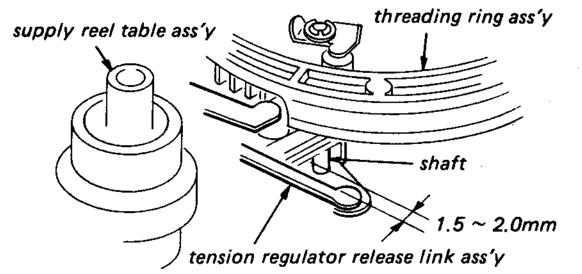
*Fig. 3-17. Position adjustment of function solenoid*

3. Check that the solenoids make the following operations when the relative mode to a solenoid is set up.

| | |
|---|---|
| • PLAY solenoid ....... | Placing the tension regulator assembly into the operation.<br>Making the FWD limiter assembly press the take-up reel table.<br>Releasing the S and T brakes.<br>Releasing the soft brakes. |
| • F. FWD solenoid ..... | Making the intermediate pulley assembly press the take-up reel table.<br>Releasing the S and T brakes. |
| • REW solenoid ....... | Making the REW idler assembly press the supply reel table.<br>Releasing the S and T brakes. |

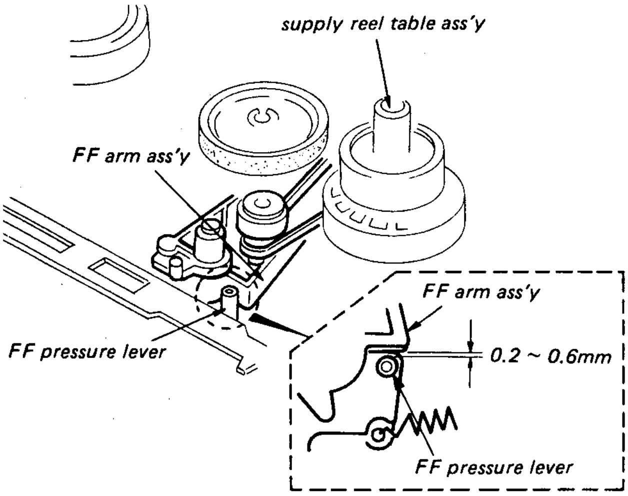
4. Check that the solenoids satisfy the specifications in Fig. 3-18. If the specifications are not satisfied, loosen the screws fixing the solenoid and adjust the position of the solenoid. See Fig. 3-17.
5. After tightening the screws, repeat Steps 3 and 4.

**(1) stroke of PLAY solenoid**


supply reel table ass'y
threading ring ass'y
shaft
1.5 ~ 2.0mm
tension regulator release link ass'y

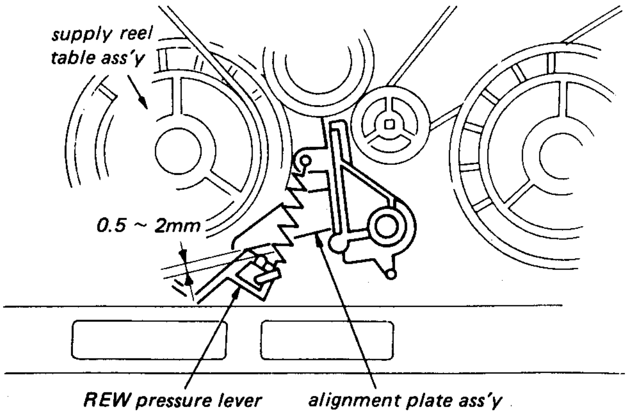
**Specification:** *A clearance of 1.5 to 2.0mm must be between the tension regulator release link ass'y and the shaft in the PLAY mode.*

**(2) stroke of F. FWD solenoid**


supply reel table ass'y
FF arm ass'y
FF arm ass'y
0.2 ~ 0.6mm
FF pressure lever
FF pressure lever

**Specification:** *A clearance of 0.2 to 0.6mm must be between the FF arm ass'y and the FF pressure lever in the F. FWD mode.*

**(3) stroke of REW solenoid**

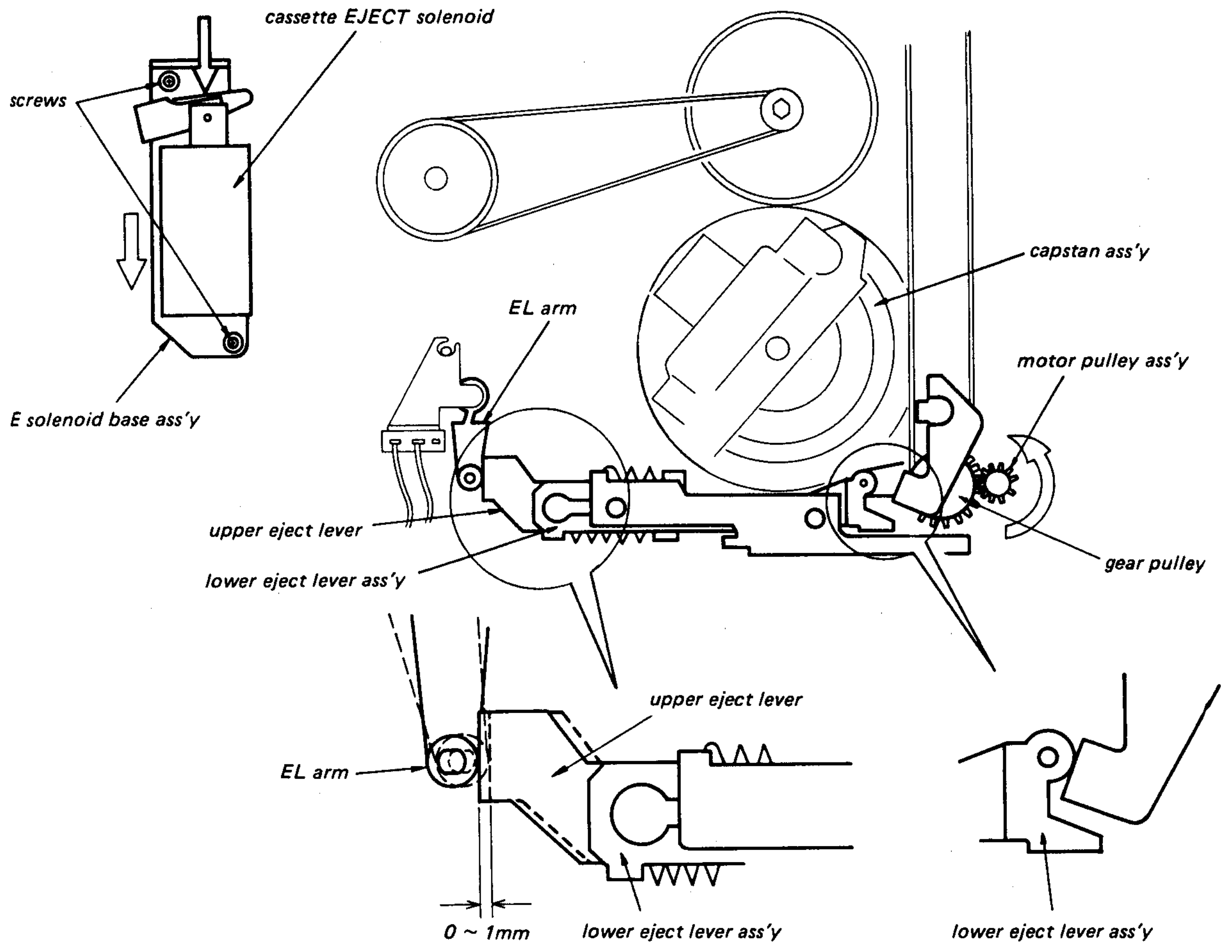

supply reel table ass'y
0.5 ~ 2mm
REW pressure lever
alignment plate ass'y

**Specification:** *A clearance of 0.5 to 2mm must be between the REW pressure lever and the alignment plate ass'y in the REW mode.*

*Fig. 3-18. Specifications of PLAY, F. FWD, and REW solenoid strokes*

### 3-8-2. Position Adjustment of EJECT Solenoid

1. Set up the STOP mode without the cassette. (See Section 1-3.)
2. Check that following operations take place when the EJECT mode is set up.
   - EJECT solenoid . . . . The E idler assembly presses the take-up reel table.
     The ring arm assembly is released.
     The cassette compartment lock is released.
     The gear pulley engages with the motor pulley assembly.
3. **Stand the machine on its left side down. Open the YC-12 and** the AS-3 boards. (Refer to Section 1-1-4.)
4. Check that the specification shown in Fig. 3-19 is satisfied. If it is not, perform Steps 5, 6, and 7.
5. Push the cassette detect lever and release the lever at a midway of the threading.
6. Loosen the two screws shown in Fig. 3-19. Move the E solenoid base assembly to the position where the specification shown in Fig. 3-19 is satisfied, while turning the motor pulley assembly counterclockwise and setting the solenoid to the energized state.
7. After tightening the screws, repeat Steps 2 and 4.


cassette EJECT solenoid
screws
E solenoid base ass'y
capstan ass'y
EL arm
motor pulley ass'y
upper eject lever
lower eject lever ass'y
gear pulley
upper eject lever
EL arm
0 ~ 1mm
lower eject lever ass'y
lower eject lever ass'y

**Specification:** *The upper eject lever must ride 0 to 1mm over the lower eject lever ass'y in the EJECT mode.*

*Fig. 3-19. Position adjustment of EJECT solenoid*

## 3-9. ADJUSTMENT OF THREADING AND UNTHREADING

### 3-9-1. Operation Check of Cassette-in Switch

1. Set up the unthreading completion state without an inserted cassette and turn off the power.
2. Set section Ⓐ as shown in Fig. 3-20.
3. Confirm that the microswitch mounted on the underside of the machine does not turn on when the cassette detection lever ① is pushed in the arrow direction.
4. Set section Ⓐ as shown in Fig. 3-21.
5. Confirm with a click that the microswitch mounted on the underside of the machine turns on when the cassette detection lever ① is pushed in the arrow direction.
6. Adjust the mounting position of cassette detection ① so that it moves more than 1.5mm further from the point where the click is heard.

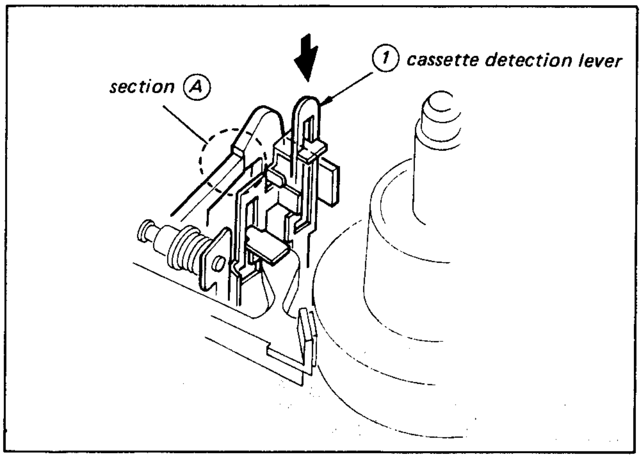

① cassette detection lever
section Ⓐ

*Fig. 3-20. Operation check of cassette-in switch*

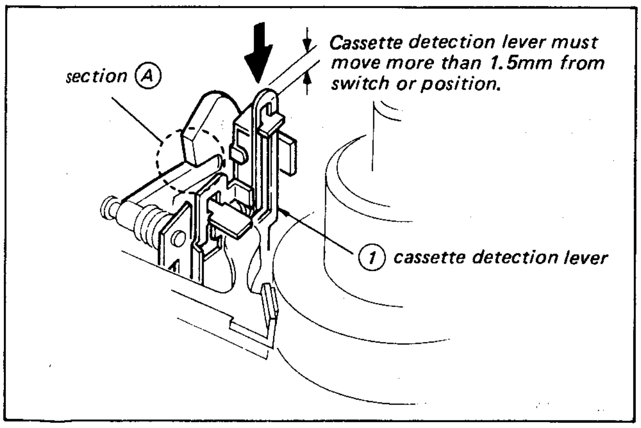

Cassette detection lever must move more than 1.5mm from switch or position.
section Ⓐ
① cassette detection lever

*Fig. 3-21. Operation check of cassette-in switch*

**Note:**
- The problem where the cassette-lift assembly does not lock occurs if the microswitch turns on in the condition shown in Fig. 3-20.
- The problem where the modes other than the EJECT mode cannot be set up occurs if the microswitch does not turn on in the state shown in Fig. 3-21.

### 3-9-2. Position Adjustment of Threading Unit B Assembly and Control Plate

1. Push down the cassette detection lever with fingers to perform the threading operation and release the lever when the threading ring assembly ⑤ shown in Fig. 3-22 has turned 90 degrees.
2. Loosen screws ① shown in Fig. 3-22. Make the clearance (0.2mm) between midway gear (B) ④ and threading ring assembly ⑤ and tighten screws ①.
3. Make a clearance of 0.5mm between control plate ③ and threading ring assembly ⑤ and tighten screw ⑥.

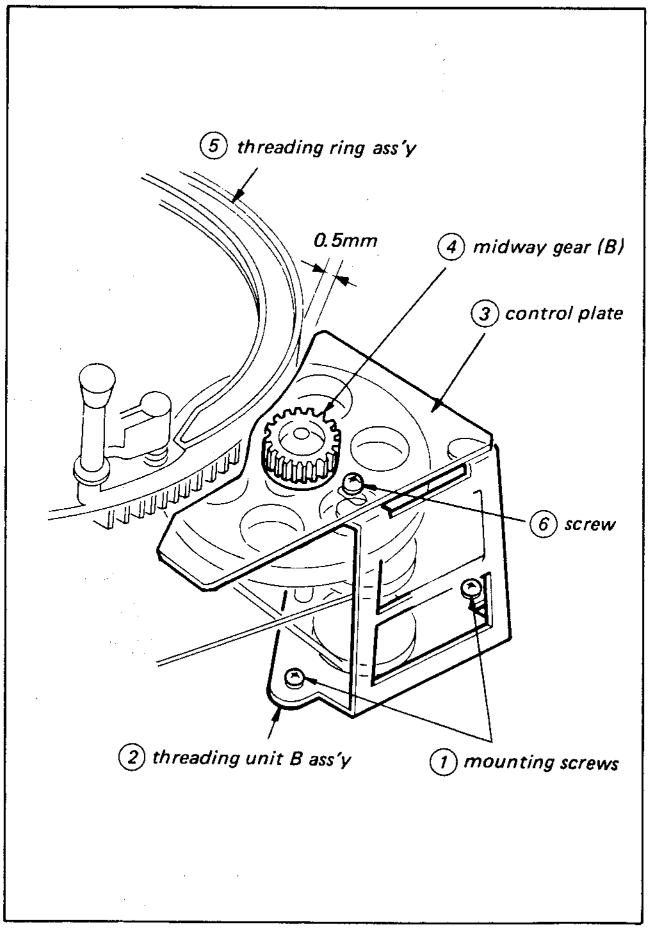

⑤ threading ring ass'y
0.5mm
④ midway gear (B)
③ control plate
⑥ screw
② threading unit B ass'y
① mounting screws

*Fig. 3-22. Position adjustment of threading unit B assembly and control plate*

### 3-9-3. Position Adjustment of Gear Pulley Hold Arm Assembly

1. Loosen screw ① shown in Fig. 3-23, adjust the position of the gear pulley hold arm assembly so that the clearance between the motor pulley assembly ② and the gear pulley ③ is 0.3 mm, and tighten screw ① .

### 3-9-4. Adhesion of Brake Shoe

1. Glue the brake shoe to the groove on the brake arm as shown in Fig. 3-23.

   **Note:** If the brake shoe is not glued in the right position, it is possible for the brake shoe to touch the capstan belt. If the shoe is removed, there is a possibility of the occurrence of an abnormal sound at the initial stage of the unthreading.

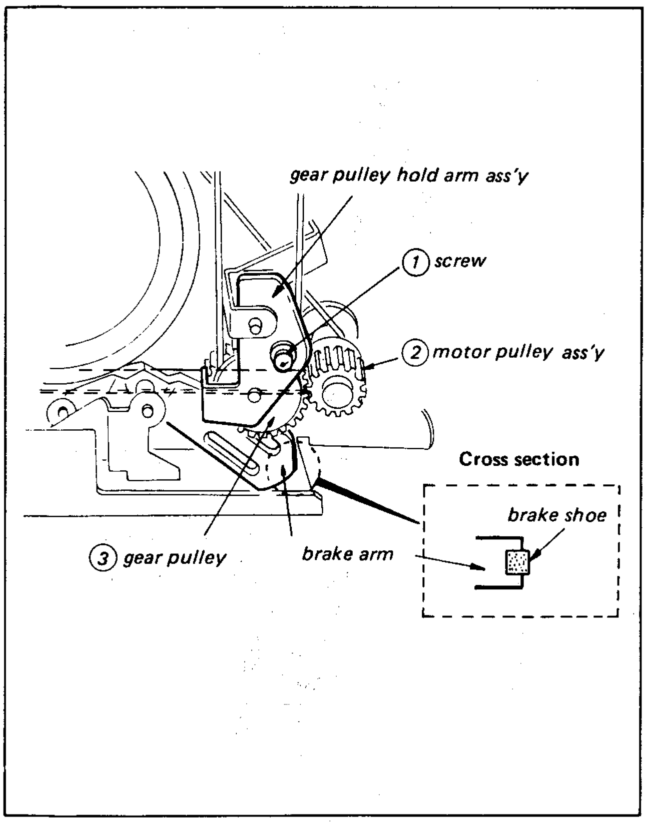

gear pulley hold arm ass'y
① screw
② motor pulley ass'y
Cross section
brake shoe
③ gear pulley
brake arm

*Fig. 3-23. Position adjustment of gear pulley hold arm assembly*

### 3-9-5. Clearance Adjustment of Cassette Lift Assembly Arm

- Since a poor adjustment of the clearance causes the condition that the cassette lift assembly arm ② is in strong contact with the threading ring assembly ③ , the threading and unthreading cannot always be performed smoothly. When the clearance is larger than the specified value, the lock of the cassette lift assembly comes loose and the cassette lift assembly lifts during the unthreading, damaging the tape.

1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
2. Loosen screw ① and adjust the position of the cassette lift assembly arm ② with the thickness gauge so that the clearance between the cassette lift assembly arm ② and the threading ring ③ satisfies the specification (0.2 mm to 0.5 mm). (See Fig. 3-24.)
3. Check the value again after the screw is tightened.

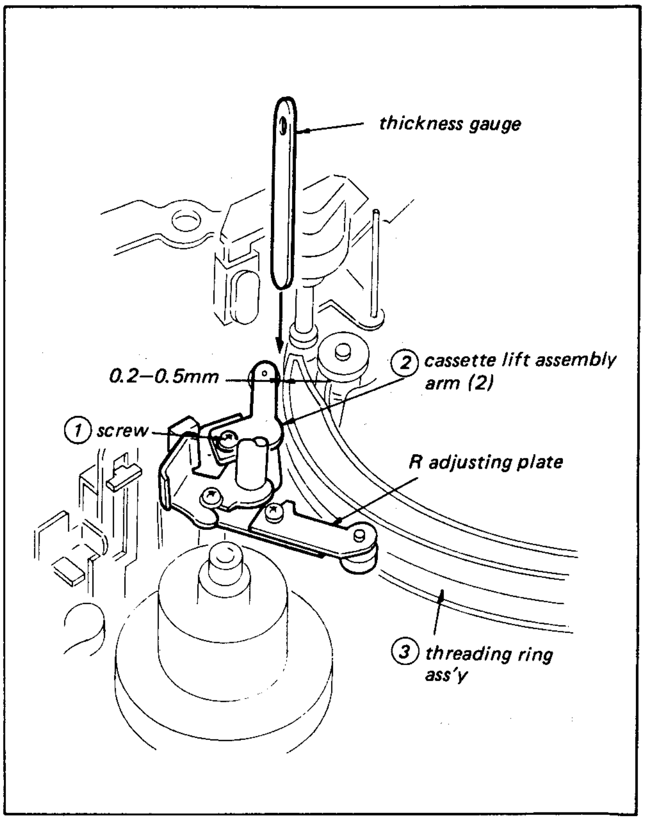

thickness gauge
0.2–0.5mm
① screw
② cassette lift assembly arm (2)
R adjusting plate
③ threading ring ass'y

*Fig. 3-24. Clearance adjustment of cassette lift assembly arm*

### 3-9-6. Clearance Adjustment of Ring Arm

- The ring arm serves to stabilize the position of the threading ring at the completion of threading. If this adjustment is wrong, there is a possibility that the threading ring may move, from the position reached at the threading completion point, during the PLAY, FAST FWD and RECORD modes.

1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
2. Set up the PLAY mode.
3. Loosen screw ① shown in Fig. 3-25 and adjust R adjusting plate assembly ② so that the clearance between the roller of R adjusting plate assembly ② and threading ring assembly ③ satisfies the specification (0 to 0.2 mm). Repeat the threading and unthreading operations several times, confirm that the roller of R adjusting plate assembly ② drops into the bottom of the cam of the threading ring, and tighten screw ① after the confirmation.

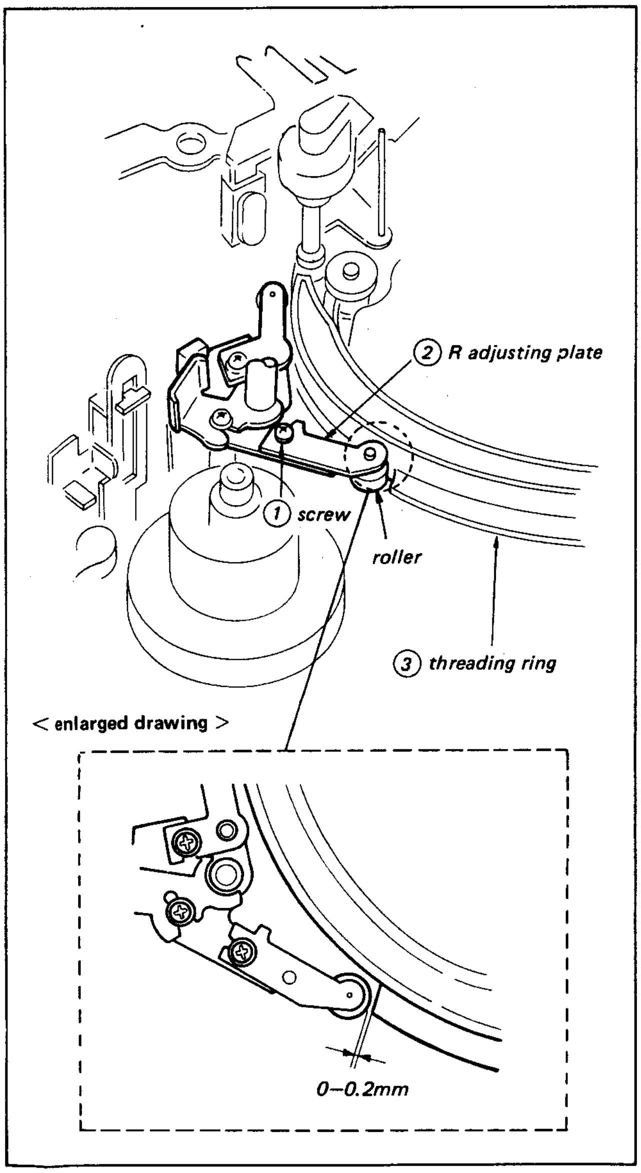
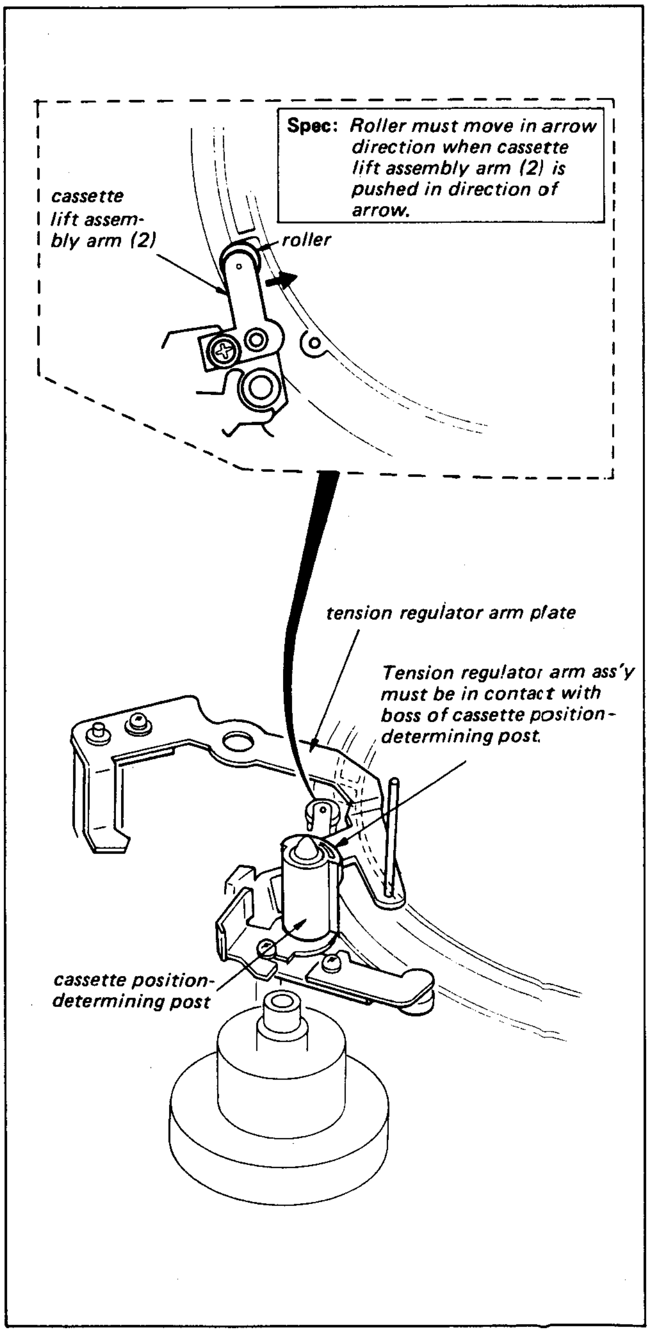

② R adjusting plate
① screw
roller
③ threading ring
< enlarged drawing >
0–0.2mm

*Fig. 3-25. Clearance adjustment of ring arm*

### 3-9-7. Check of Unthreading Completion

1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
2. Set up the EJECT mode to complete the unthreading.
3. Confirm that the roller of cassette lift assembly arm (2) shown in Fig. 3-26 moves in the arrow direction when the cassette lift assembly arm (2) is pushed in the arrow direction.
4. Confirm that the tension regulator arm assembly is in contact with the boss of the cassette position-determining post. (See Fig. 3-26.)


cassette lift assembly arm (2)
roller
tension regulator arm plate
cassette position-determining post

**Spec:** *Roller must move in arrow direction when cassette lift assembly arm (2) is pushed in direction of arrow.*

*Tension regulator arm ass'y must be in contact with boss of cassette position-determining post.*

*Fig. 3-26. Check of unthreading completion*

## 3-10. POSITION ADJUSTMENT OF LID OPENER

- The mounting position of the cassette lid opener bracket is different when the cassette lift assembly is attached and is not attached to the SL-C7F.

1. When the cassette lift assembly is attached;

   (i) The plate of the cassette lid opener bracket must be near the center of the slot in the white plastic holder guide when the cassette lift assembly is lowered. If it is not in this position, bend the lower section of the cassette lid opener bracket, as shown in Fig. 3-27. for adjustment.

   (ii) Confirm that section Ⓐ in Fig. 3-27 satisfies the specification (0.5mm to 3mm) when the cassette is inserted and the PLAY mode is set up. This is the spacing between the tape and the take-up sensor.

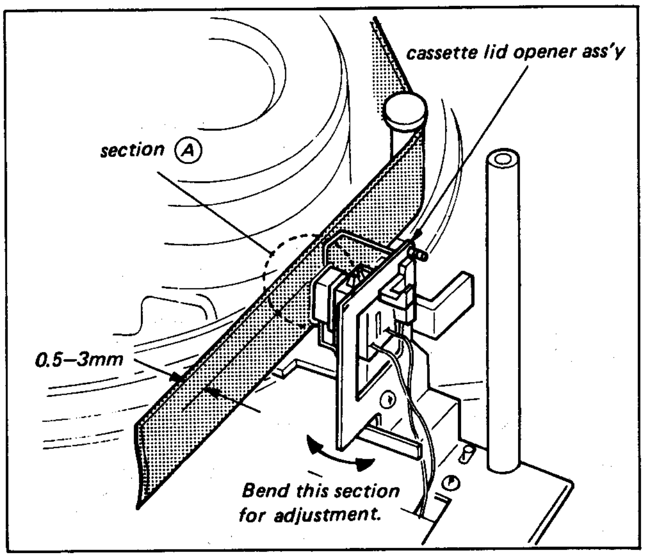


*Fig. 3-27. Position adjustment of cassette lid opener metal (1)*

2. When the cassette lift assembly is not attached;

   (i) Bend the lower section of the cassette lid opener bracket so that the cassette lid opener bracket positions itself almost at the center of the space marked by asterisk (*) shown in Fig. 3-28, when the cassette is placed on the four position determining posts.

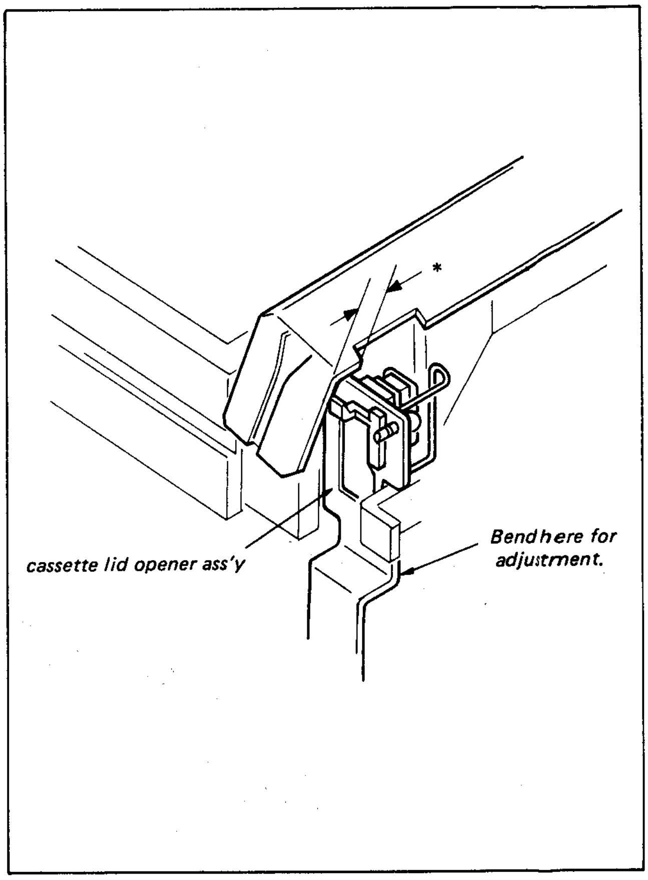


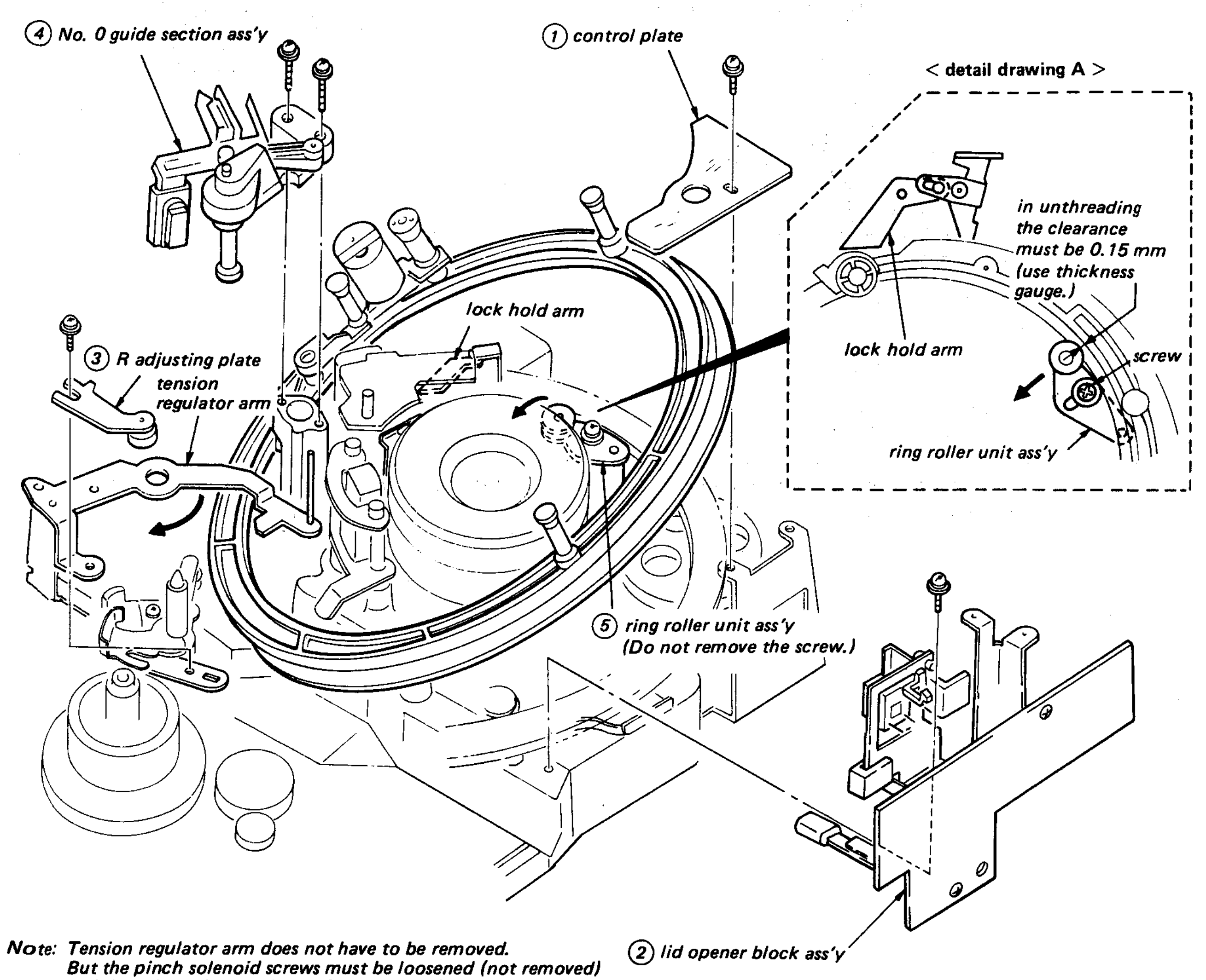
*Fig. 3-28. Position adjustment of cassette lid opener metal (2)*

## 3-11. REPLACEMENT AND ADJUSTMENT OF THREADING RING ASSEMBLY

1. Turn the threading ring to a point immediately before the threading completion position and stop it at the point where it does not touch the lock hold arm. (See Fig. 3-29.)
2. Perform procedures ① to ⑤ shown in Fig. 3-29.
3. Remove the threading ring while moving the tension regulator arm assembly in the arrow direction by holding its lower section.

   **Note:** Do not hold the upper section of the tension regulator arm while moving the assembly.

4. Perform the adjustment of control plate ①, R adjusting plate ③, No. 0 guide section assembly ④, and ring roller unit assembly ⑤ after the replacement.
   - (i) As to the adjustment of control plate ①, refer to "Position Adjustment of Threading Unit B assembly and Control Plate", Section 3-9-2.
   - (ii) As to the adjustment of R adjusting plate ③, refer to "Clearance Adjustment of Ring Arm", Section 3-9-6.
   - (iii) As to the adjustment of No. 0 guide section assembly ④, perform procedure 6 of this section.
   - (iv) As to the adjustment of ring roller unit assembly ⑤, perform the adjustment, referring to detail drawing A in Fig. 3-29.
5. Perform the threading and unthreading several times and confirm the smooth movement of the threading ring.


④ No. 0 guide section ass'y
① control plate
< detail drawing A >
in unthreading the clearance must be 0.15 mm (use thickness gauge.)
lock hold arm
screw
ring roller unit ass'y
lock hold arm
③ R adjusting plate
tension regulator arm
⑤ ring roller unit ass'y (Do not remove the screw.)
② lid opener block ass'y

*Note: Tension regulator arm does not have to be removed. But the pinch solenoid screws must be loosened (not removed) and the solenoid slipped out of the way to finally remove the threading ring.*

*Fig. 3-29. Replacement of threading ring block assembly*

6. Adjustment after the mounting of No.0 guide section assembly
   (i) Playback the 1MHz segment of the alignment tape (KR5-1J).
   (ii) Turn the TRACKING control knob so that the RF waveform at TP2005 on RF-2 board is 2/3 of its maximum level. (See Fig. 3-30.)
   (iii) Turn the No.0 guide shown in Fig. 3-30 fully counterclockwise (↺), then clockwise until the point where the RF waveform at the exit section becomes flat with small fluctuation, and tighten the mounting screws.

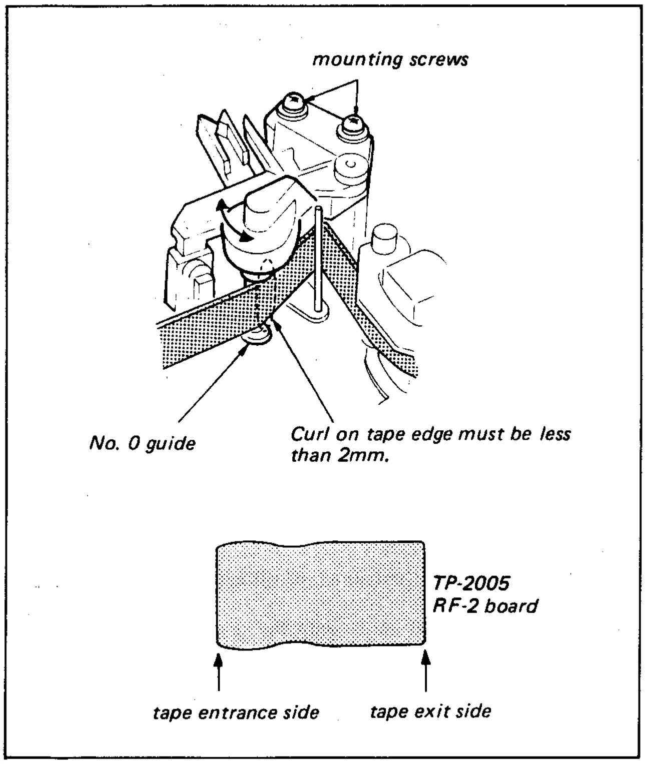

mounting screws
No. 0 guide
Curl on tape edge must be less than 2mm.
TP-2005
RF-2 board
tape entrance side
tape exit side

*Fig. 3-30. Position adjustment of No.0 guide section assembly mounting*

## 3-12. POSITION ADJUSTMENT OF PINCH ROLLER SOLENOID

### 3-12-1. Parallelism Adjustment of Pinch Press Lever

1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
2. Perform Steps ① to ③ shown in Fig. 3-31 so as to set up the state in which the screw of pinch press lever shaft adjusting plate ④ can be loosened.
3. Loosen the two screws ① fastening the pinch solenoid base ③ shown in Fig. 3-32 and tighten screws ① when the pinch solenoid base ③ becomes parallel to the drum base.
4. Loosen two screws ② shown in Fig. 3-32 by 1/3 to 1/2 turn and move pinch press lever shaft adjusting plate ④ in the direction shown by arrow B.
5. Insert a standard blade-tip screwdriver into hole F when the iron core is pulled slightly and pinch roller arm assembly ⑤ touches capstan shaft ⑥ equally along the complete length of the pinch roller. The pinch roller and the capstan should be parallel. Move the pinch press lever shaft adjusting plate ④ in the direction shown by arrow C and tighten the two screws ② when clearance A becomes 0.

**Note:** If the pinch roller arm assembly ⑤ does not touch the capstan with parallel and equally force when the iron core is pulled slightly, move pinch solenoid base ③ with a standard blade-tip screwdriver in the direction shown by arrow D.

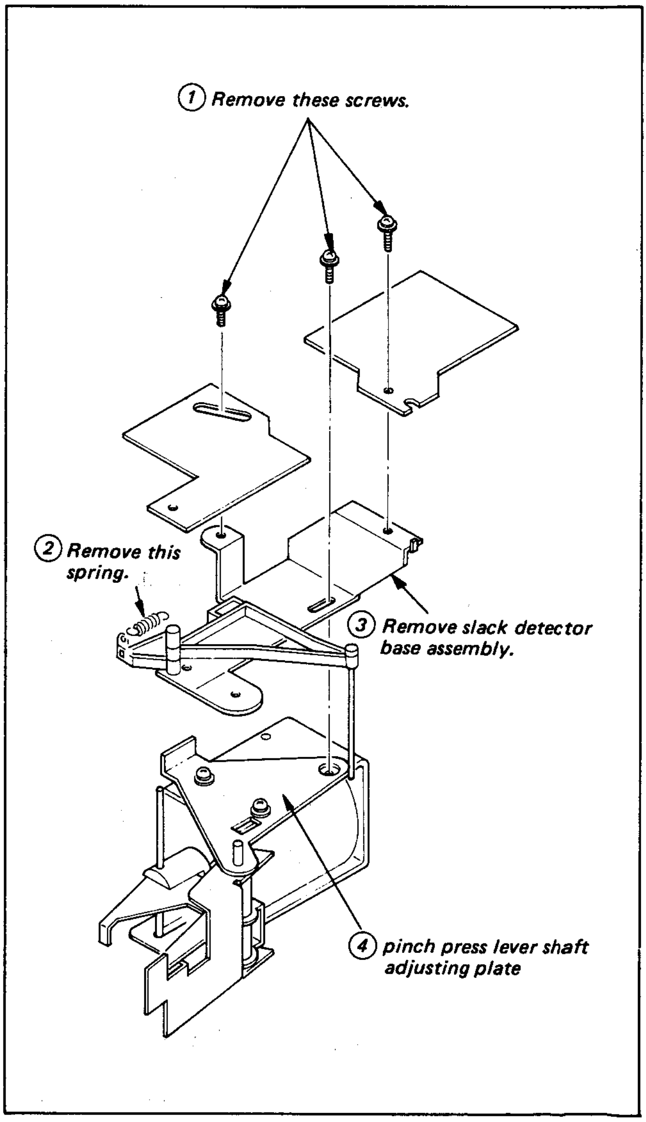

① Remove these screws.
② Remove this spring.
③ Remove slack detector base assembly.
④ pinch press lever shaft adjusting plate

*Fig. 3-31. Disassembly*

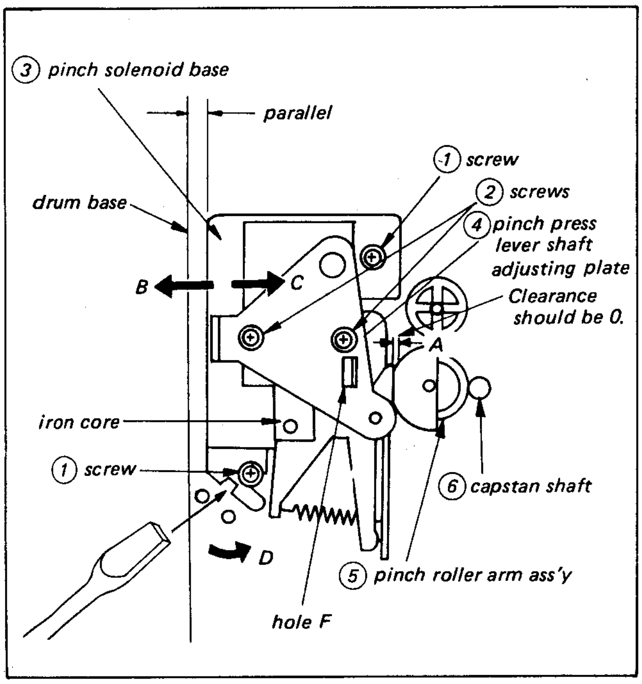
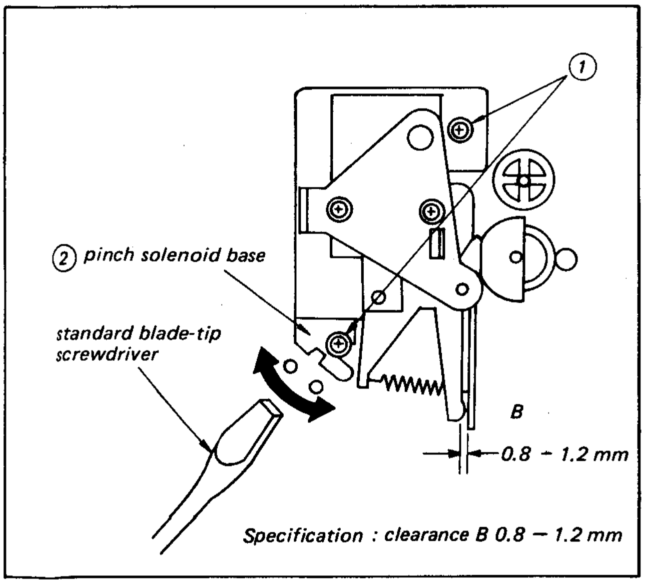

③ pinch solenoid base
parallel
① screw
② screws
④ pinch press lever shaft adjusting plate
Clearance should be 0.
drum base
B
C
A
iron core
① screw
⑥ capstan shaft
D
⑤ pinch roller arm ass'y
hole F

*Fig. 3-32. Position adjustment of pinch roller solenoid*

### 3-12-2. Position Adjustment of Pinch Solenoid

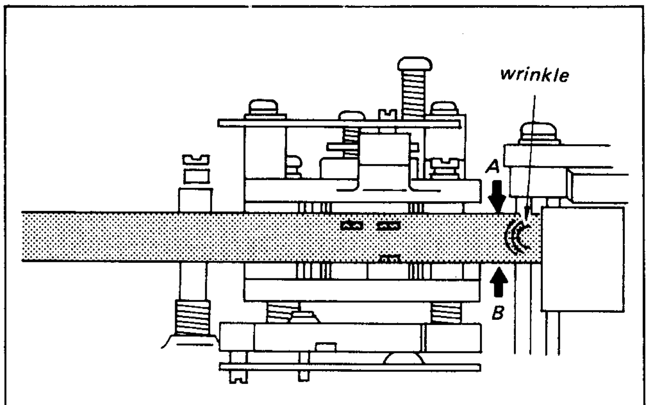
1. Check that "Parallelism Adjustment of Pinch Press Lever", Section 3-12-1, has been completed.
2. Loosen the two screws ① shown in Fig. 3-33 by 1/3 to 1/2 turns.
3. Insert the cassette (L-500) and set up the PLAY mode.
4. Insert the standard blade-tip screwdriver as shown in Fig. 3-33. Move pinch solenoid base ② in the arrow direction so that the specification at section B is satisfied, and tighten the two screws ①.


①
② pinch solenoid base
standard blade-tip screwdriver
B
0.8 ~ 1.2 mm

*Specification : clearance B 0.8 – 1.2 mm*

*Fig. 3-33. Position adjustment of pinch solenoid*

5. Tap the top and bottom of the tape around the capstan entrance and confirm that the specification shown in Fig. 3-34 is satisfied. If not, repeat Step 5 of Section 3-12-1, "Parallelism Adjustment of Pinch Press Lever".
6. Reverse Steps ① to ③ shown in Fig. 3-31.

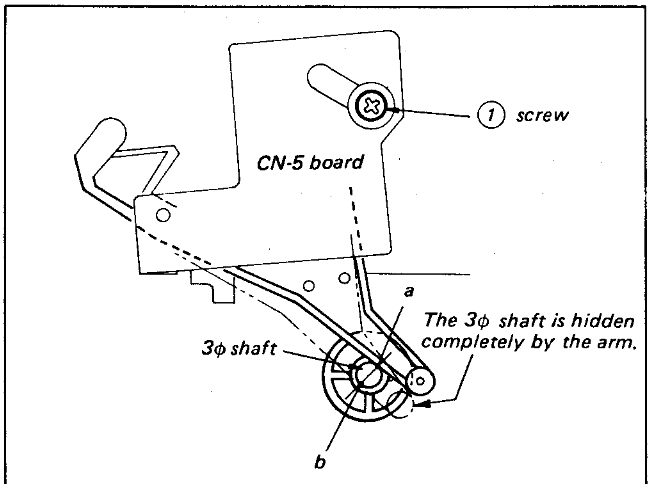


**Specification:** *|a-b| <5 sec*
*where*
*a ..... time required for wrinkle disappearance when tapping is made in the arrow A direction*
*b ..... time required for wrinkle disappearance when tapping is made in the arrow B direction*

*Fig. 3-34.*

### 3-12-3. Position Adjustment of Slack Sensor Operation

1. Set up the STOP mode with the cassette. (Refer to Section 1-3.)
2. Loosen screw ① and adjust the CN-5 board position to satisfy the specification shown in Fig. 3-35.


① screw
CN-5 board
a
The 3φ shaft is hidden completely by the arm.
3φ shaft
b

**Specification:**
*Reed switch must turn on between a and b.*

*Fig. 3-35. Position adjustment of slack sensor operation*

## 3-13. ADJUSTMENT OF BRAKE RELEASE STROKE

- The FB slide plate shown in Fig. 3-36 releases the take-up, the supply, and the soft brakes.

1. Place the machine without the cassette into the STOP mode. (Refer to Section 1-3.)
2. Bend section E of FB slide plate ② so that the specification (0.5 to 1mm) of section C when brake release arm ① is pushed in the direction of arrow D so that the clearances at sections A and B are eliminated.
3. Set up the PLAY mode and check that the take-up, the supply, and the soft brakes are released.

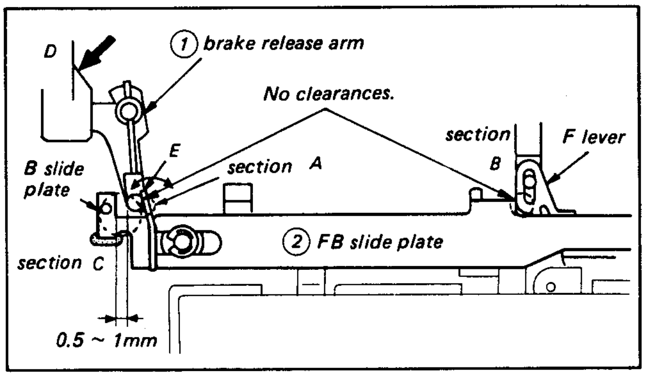

D
① brake release arm
No clearances.
section B
F lever
E
B slide plate
section A
② FB slide plate
section C
0.5 ~ 1mm

*Fig. 3-36. Position adjustment of FB slide plate*

## 3-14. POSITION ADJUSTMENT OF MICROSWITCH

### 3-14-1. Position Adjustment of Erasing Protection Microswitch

1. Remove the tuner block from the machine. (Refer to Section 1-1-2.)
2. Open the SY-11 board.
3. Check that the contact point of the erasing protection microswitch shown in Fig. 3-37 closes.
4. Loosen screws ② and adjust the position of the switch while lowering the cassette with lid opened so that the cassette stops at the position more than 1mm from the contact point of the switch opens.

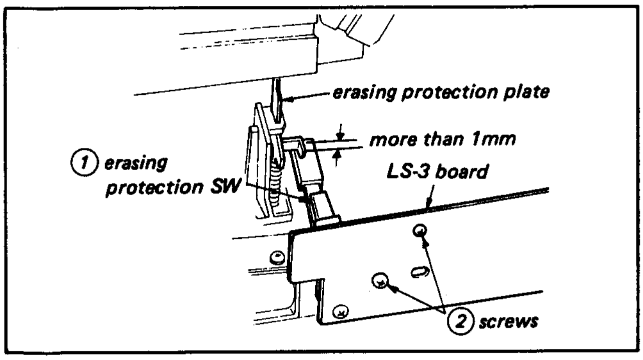

erasing protection plate
more than 1mm
① erasing protection SW
LS-3 board
② screws

*Fig. 3-37. Position adjustment of erasing protection microswitch*

### 3-14-2. Position Adjustment of Threading End Switch

- Prior to this adjustment, the following adjustments must be completed.

  3-9-5. Clearance adjustment of cassette lift assembly arm
  3-9-6. Clearance adjustment of ring arm
  3-9-7. Check of unthreading completion

1. Turn the threading ring by hand and stop it at the point immediately before the threading completion position.
2. Loosen screw ④ and adjust the position of microswitch ③ so that microswitch ③ turns on before gear pulley hold arm ① moves from the groove of lock arm ②, while turning the threading ring counterclockwise (↺) slowly by hand. Confirm the turning-on of the microswitch with a click.
3. Adjust the position further so that the clearance between the actuator of microswitch ③ shown in Fig. 3-38 and the microswitch satisfies the specification (0.7mm to 1.0mm) when the threading ring is turned counterclockwise (↺) beyond the threading completion point.
4. Repeat Steps 2 and 3 for confirmation.

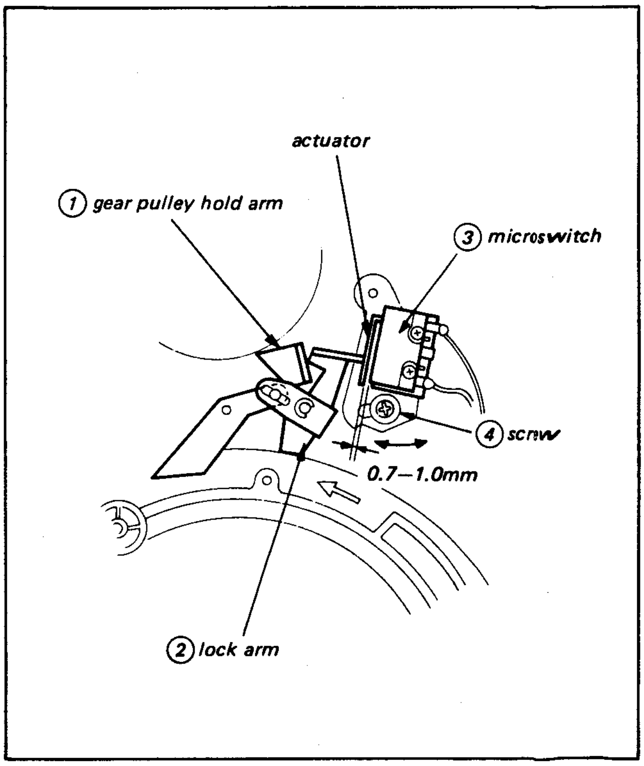
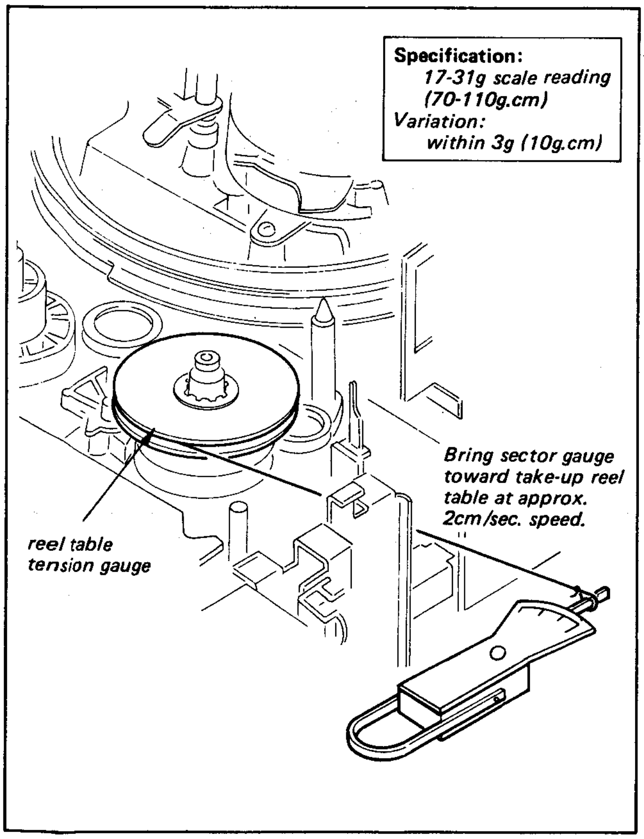

actuator
① gear pulley hold arm
③ microswitch
④ screw
0.7–1.0mm
② lock arm

*Fig. 3-38. Position adjustment of threading end switch*

## 3-15. CHECK OF TAKE-UP TORQUE

- Since sufficient take-up torque cannot be obtained at the last section of the tape if the take-up torque is below the specified value, tape slackness is caused at the capstan shaft point and sometimes the slack sensor operates.
- The take-up torque tends to increase gradully due to aging.

1. Rewind the tape a little and set up the PLAY mode (for the playback of the very last section of the tape) after the auto-stop at the tape end in the FAST FWD mode. Confirm that the tape runs without any slackness at the capstan shaft area. If the tape slackens, perform the following adjustments.
2. Clean the take-up reel table assembly, the FWD idler assembly, and the FWD belt with a piece of cloth dampened with isopropyl alcohol.
3. Stop the operation of the slack sensor. (Refer to section 1-4.)
4. Attach the reel table tension gauge (Tool Kit Ref. No. J-5) on the take-up reel table as shown in Fig. 3-39.
5. Pull out the string from the reel table tension gauge about 30 cm (12 inches) and hook the sector type tension gauge (50g full scale, Tool Kit Ref No. J-7) on the end of string.
6. Set up the PLAY mode.
7. Bring the sector type gauge toward the take-up reel table at a speed of approx. 2cm/sec. (8 inch/sec.) as shown in Fig. 3-39. Confirm that the gauge reading is within the specification. If not, replace the FWD limiter assembly and make the check again.


**Specification:**
*17-31g scale reading*
*(70-110g.cm)*
*Variation:*
*within 3g (10g.cm)*

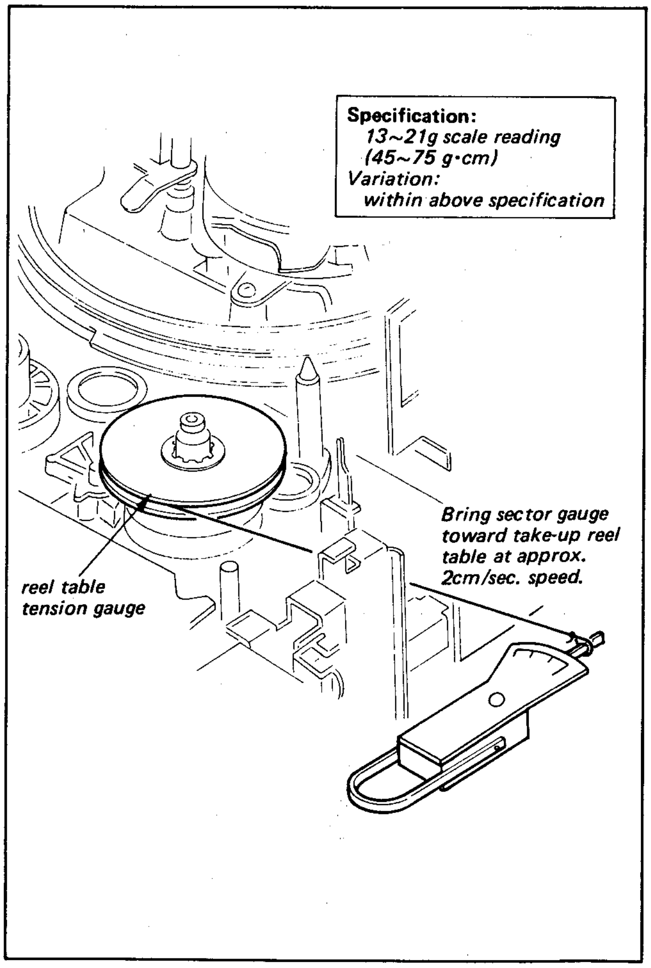
*Bring sector gauge toward take-up reel table at approx. 2cm/sec. speed.*

*Fig. 3-39. Check of take-up torque*

## 3-16. CHECK OF CASSETTE EJECT TORQUE

- The tape is taken up by the take-up reel table in the cassette EJECT mode. The take-up reel table is driven via the belt by the DC motor, while the threading ring unthreads.
- If the cassette eject torque is below the specification, only the threading ring performs the unthreading operation while the tape is not pulled back into the cassette, and the tape can be damaged.

1. Clean the take-up reel table, the E idler assembly, and the EJECT belt with a piece of cloth dampened with isopropyl alcohol.
2. Attach the reel table tension gauge (Tool Kit Ref. No. J-5) as shown in Fig. 3-40.
3. Pull out the string of the gauge about 30 cm (12 inches) and hook the sector type gauge (50g full scale, Tool Kit Ref. No. J-7) on the end of the string.
4. Set up the EJECT mode.
5. Bring the sector type gauge toward the take-up reel table at a speed of approx. 2cm/sec. during the unthreading as shown in Fig. 3-40. Confirm that the gauge reading is within the specification. If not, replace the E limiter assembly (X-3659-301-0) of the threading unit section and make the confirmation again.


**Specification:**
*13~21g scale reading*
*(45~75 g·cm)*
*Variation:*
*within above specification*

*Bring sector gauge toward take-up reel table at approx. 2cm/sec. speed.*

*Fig. 3-40. Check of cassette eject torque*

## 3-17. CHECK OF BRAKE TORQUE

- This machine has the supply brake, take-up brake, soft brake, and pause brake to stop the taking-up of the tape in the PAUSE mode. These brakes operate as follows.

| Reel table ass'y<br>Mode | Supply side | Take-up side |
|---|---|---|
| **Cassette EJECT mode** | Supply and soft brakes are ON. | Only take-up brake is ON. |
| **Threading mode** | Only soft brake is ON. (It is normal that the supply reel rotates a little, supplying tape.) Soft brake torque; 15 to 30 g.cm. Reel table rotational direction is CW (↻). | Free (Tape is supplied from take-up side.) |
| **STOP mode** | Supply and soft brakes are ON.<br>Reel table rotational direction CW (↻):<br>100 to 500g.cm<br>Reel table rotational direction CCW (↺):<br>40 to 100g.cm | Only main brake is ON.<br>Reel table rotational direction CW (↻):<br>30 to 100g.cm<br>Reel table rotational direction CCW (↺):<br>60 to 500g.cm |
| **FF mode** | Only soft brake is ON. | Free (Tape is taken up to take-up side.) |
| **REW mode** | Free | Free |
| **PLAY mode** | Only FWD back tension brake band is ON. | Free (Tape is taken up to take-up side.) |
| **REC PAUSE mode & PLAY PAUSE mode** | FWD back tension brake is ON. | Take-up and pause brakes are ON. |
| **Unthreading mode** | Only soft brake is ON. (It is normal that supply reel rotates a little, supplying tape.) | Free (Tape is taken up to take-up side.) |

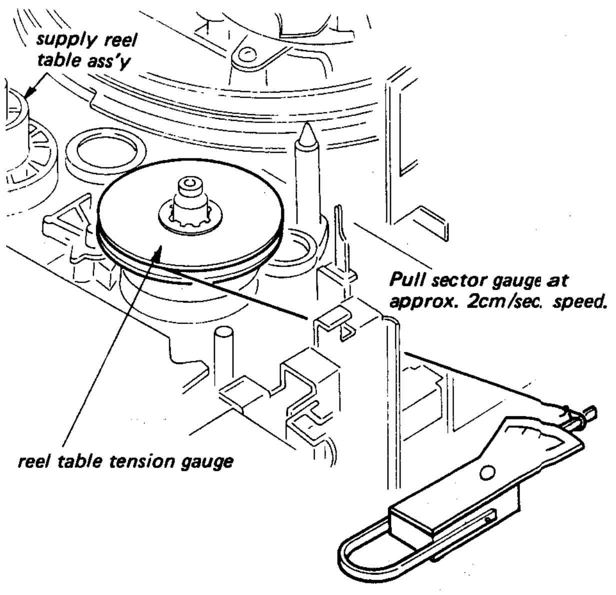
### 3-17-1. Check of Supply and Take-up Brake Operations

- When the tape slackens in when the mode is changed to STOP from PLAY and to STOP from REWIND, perform the check and adjustment, following the steps below.
- Since the slackness tends to occur when a wound diameter of the tape on a reel table is small, the check must be made in such a state.

1. Insert the cassette and set up the initial state of taking-up of the tape. (Rewind the tape and cue its beginning.)
2. Repeat the operation, changing the mode from PLAY to STOP two or three times and confirm that there is no tape slackness. If the tape slackens, perform steps 5 and 6 for adjustment.
3. Set-up the condition where the tape is about to be completely wound on the take-up reel. (Fast forward the tape and stop the tape movement at its end section.)
4. Repeat the operation, changing the mode from REWIND to STOP two or three times and confirm that no tape slackness occurs. If the tape slackens, perform Steps 5 and 6 for adjustment.
5. Remove the reel table assembly and clean the surface of the reel table assembly and the brake shoe with a piece of cloth dampened with isopropyl alcohol.
6. Clean the brake lining of the S and T brake with a piece of cloth dampened with isopropyl alcohol. If the tape still slacks even if the brake lining clean, replace them and perform the check again.

### 3-17-2. Check of Supply and Take-up Brake Torque

1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
2. Attach the reel table tension gauge (Tool Kit Ref. No. J-5) to the take-up reel table as shown in Fig. 3-41 and hook the sector type gauge (100g full scale, Tool Kit Ref. No. J-8) to the end of the string. Pull the sector type gauge at a speed of approx. 2 cm/sec. and read the gauge value.



*Note: This figure shows the take-up torque check. For supply brake torque check, set reel table tension gauge on supply reel table.*

*Fig. 3-41. Check of supply and take-up brake torque*

**Specification**

- When supply reel table ass'y rotates CW (↻):
  100 to 500g.cm (Scale value is 29 to 143g.)
- When supply reel table ass'y rotates CCW (↺):
  40 to 100g.cm (Scale value is 11 to 37g.)
- When take-up reel table ass'y rotates CW (↻):
  30 to 100g.cm (Scale value is 6 to 17g.)
- When take-up reel table ass'y rotates CCW (↺):
  60 to 500g.cm (Scale value is 17 to 143g.)

### 3-17-3. Check and Adjustment of Soft Brake Torque

1. Push the cassette detector lever by hand and release the lever during the threading. (In this condition, the supply and take-up brakes are released.)

2. Mount the reel table tension gauge (Tool Kit Ref. No. J-5) on the supply reel table as shown in Fig. 3-42 and hook the sector type guage (50g full scale, Tool Kit Ref. No. J-7) to the end of the string of the tension gauge.

3. Pull the sector type gauge at a speed of approx. 2cm/sec. and confirm that the gauge reading is within the specification. If the specification is not satisfied, change the position where the spring is hooked onto the soft brake and the F slide plate for adjustment and perform Steps 2 and 3.

**Specification:** *Scale reading . . . 4.5~9g (15~30g.cm)*

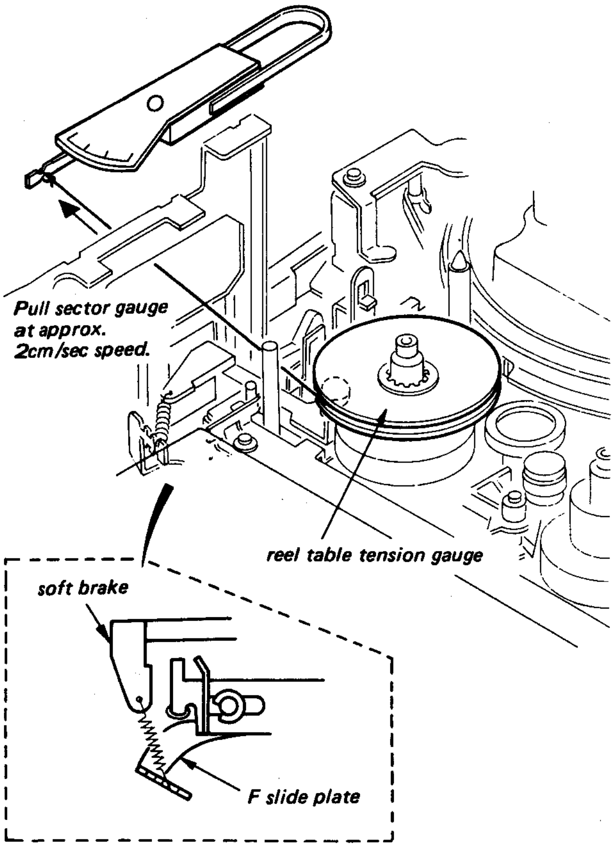


*Fig. 3-42. Check of soft brake torque*

## 3-18. ADJUSTMENT OF FWD BACK TENSION

- The ideal measurement of the FWD back tension is to measure it under the same conditions as during the actual tape running state. The simple measurement procedure of the FWD back tension is described here. The measurement error due to the different measurement procedure is corrected in the specification.

1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)

2. Place the FWD back tension jig (Tool Kit Ref. No. J-6) on the supply reel table assembly and thread the tape as shown in Fig. 3-43. Hook the sector type gauge (100g full scale, Tool Kit Ref. No. J-8) to the end of the tape.

3. Set up the PLAY mode.

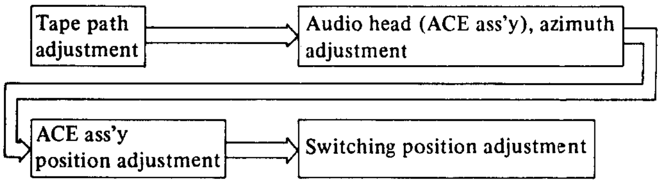
4. Pull the sector type gauge at a speed of approx. 2cm/sec. and confirm that the gauge reading is within the specification. If not, perform Steps 5 and 6.

5. Loosen the screw mounting the BT adjusting plate and move the BT adjusting plate in the direction shown by the arrow for the adjustment.

6. Repeat Steps 2 to 4 again.

## 3-19. ADJUSTMENT OF TRACKING

- Sequence of tracking adjustment


Tape path adjustment
Audio head (ACE ass'y), azimuth adjustment
ACE ass'y position adjustment
Switching position adjustment

**[Preparation]**

1. Fixtures and Tools Required:
   Alignment tape (KR5-1J)
   Dual trace oscilloscope
   Inspection mirror
   Methanol or Isopropyl Alcohol
   Chamois
   3 mm flat tip screwdriver

2. Oscilloscope connection

| | | |
|---|---|---|
| RF envelope waveform: | TP2005 . . . . . | RF-2 board |
| External trigger: | TP2003 . . . . . | RF-2 board |
| AUDIO OUT: | TP3406 . . . . . | AS-3 board |
| VIDEO OUT: | TP1017 . . . . . | YC-12 board |
| Switching waveform: | TP2003 . . . . . | RF-2 board |

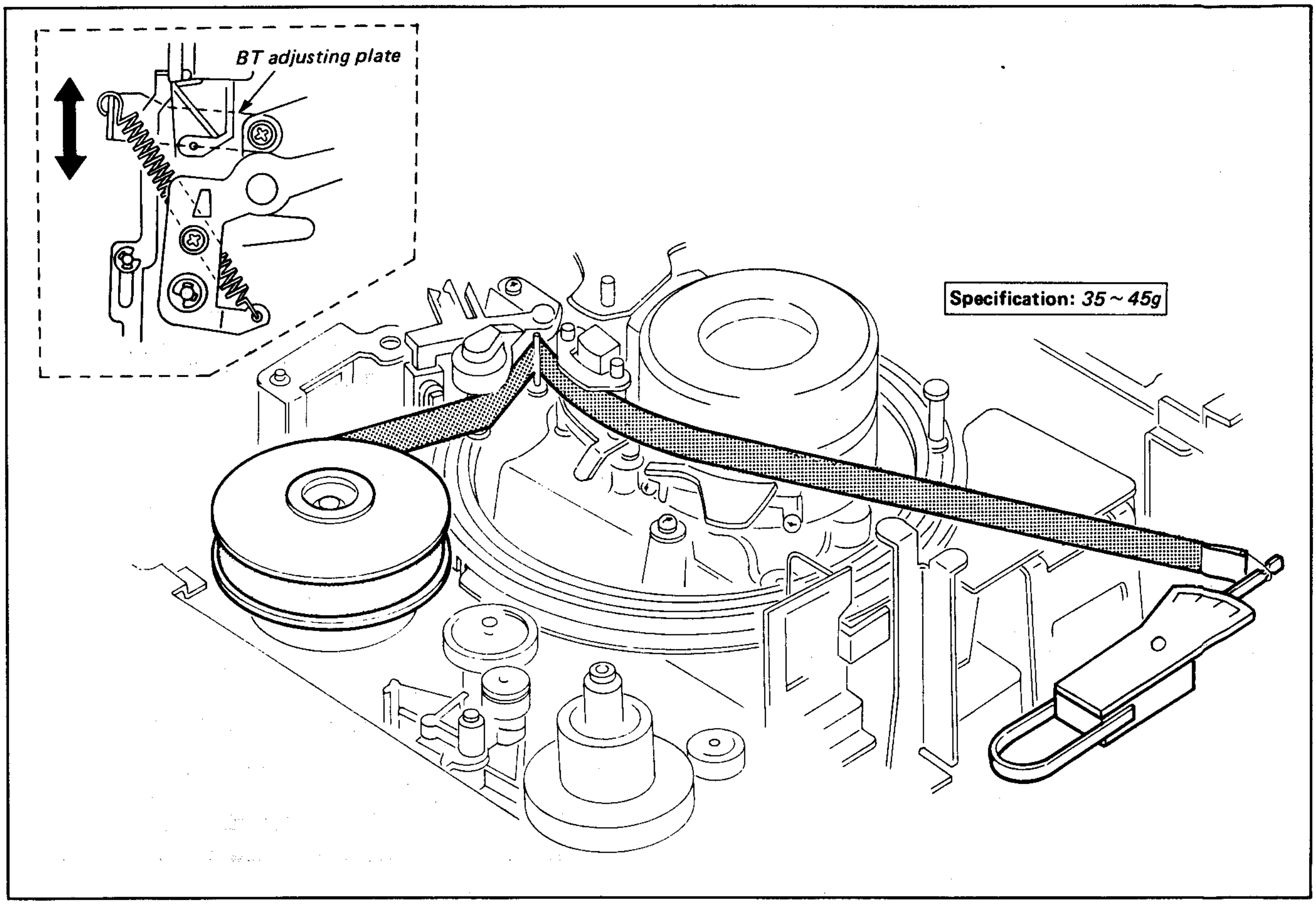

BT adjusting plate
Specification: 35 ~ 45g

Fig. 3-43. Adjustment of FWD back tension

4. Location of circuit boards

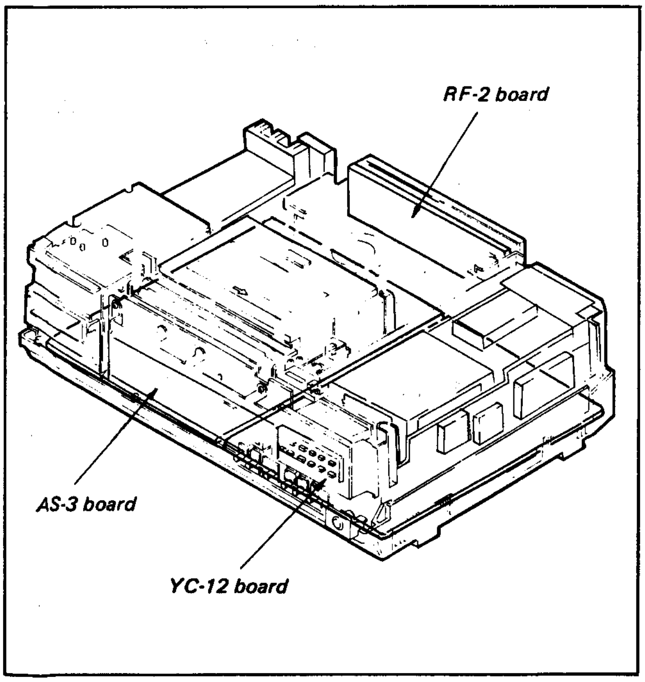

RF-2 board
AS-3 board
YC-12 board

Fig. 3-44. Location of circuit boards

5. Location tape guides

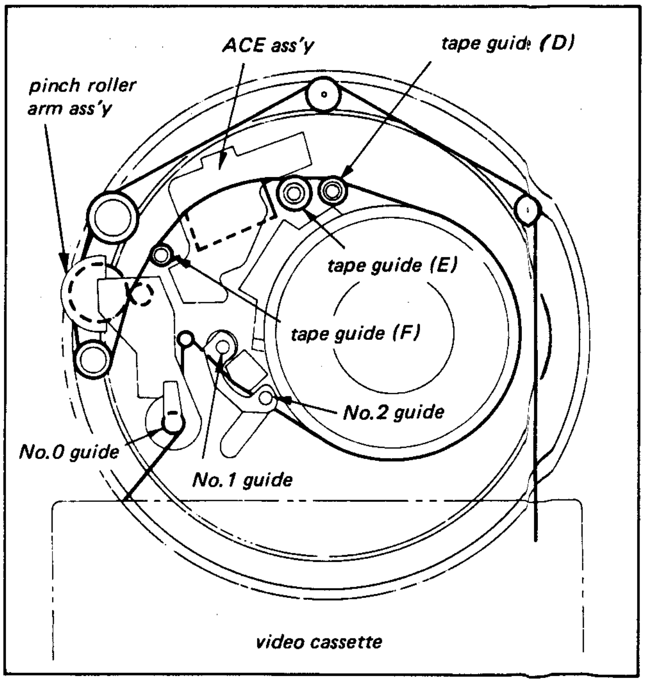
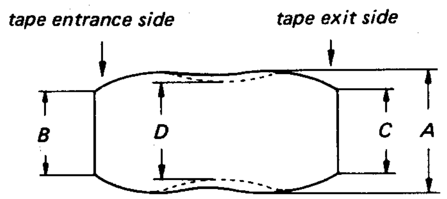

ACE ass'y
tape guide (D)
pinch roller
arm ass'y
tape guide (E)
tape guide (F)
No.2 guide
No.0 guide
No.1 guide
video cassette

Fig. 3-45. Location of tape guides

### 3-19-1. Adjustment of Tape Path

- Perform this adjustment carefully because poor adjustment reduces tape interchangeability and picture quality.

1. Clean the tape movement faces (the tape guide, drum, capstan and pinch roller) with chamois dampened with methanol or isopropyl alcohol.
2. Connect the oscilloscope to TP-2005 on the RF-2 board and the external trigger to TP-2003.
3. Play back the 1 MHz segment of the alignment tape (KR5-1J).
4. Confirm that the RF output waveform envelope on the oscilloscope screen increases and decreases, while remaining flat, when the TRACKING control knob is turned to the left and the right from its center detent position. If the RF waveform does not increase and decrease while remaining flat, perform Step 6 for the adjustment.


tape entrance side
tape exit side
B
D
C
A

**Specification:**
*TRACKING control knob at optimum position.*
*tape-to-head*
*contact:* $\frac{B}{A} \geqq 0.7$

$\frac{C}{A} \geqq 0.7$

*variation:* $\frac{D}{A} \geqq 0.9$

*Fig. 3-46. Adjustment of tape path*

5. Confirm that the fluctuation and the tape-to-head contact satisfy the specification shown in Fig. 3-46. If they do not, perform Step 6 for the adjustment.

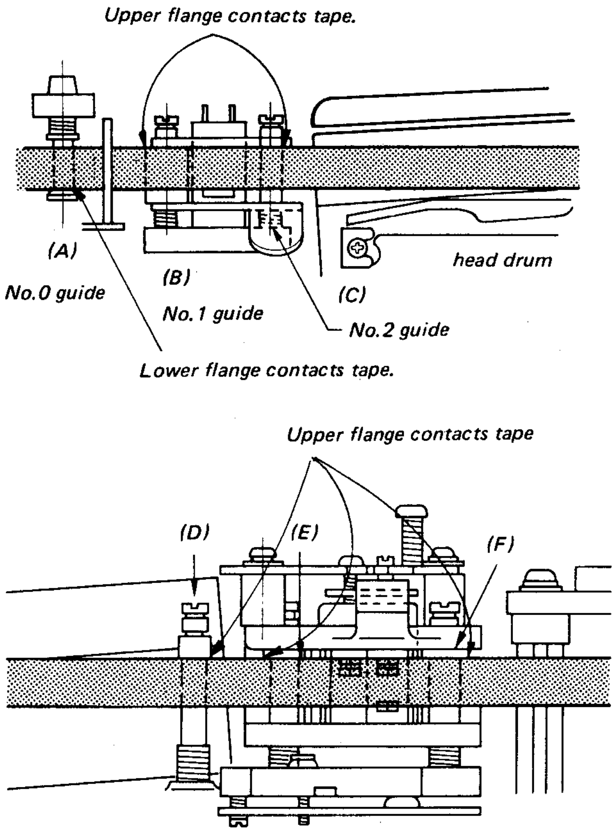

Upper flange contacts tape.
(A)
No. 0 guide
(B)
No. 1 guide
(C)
No. 2 guide
head drum
Lower flange contacts tape.
Upper flange contacts tape
(D)
(E)
(F)

*Fig. 3-48. Adjustment of tape path*

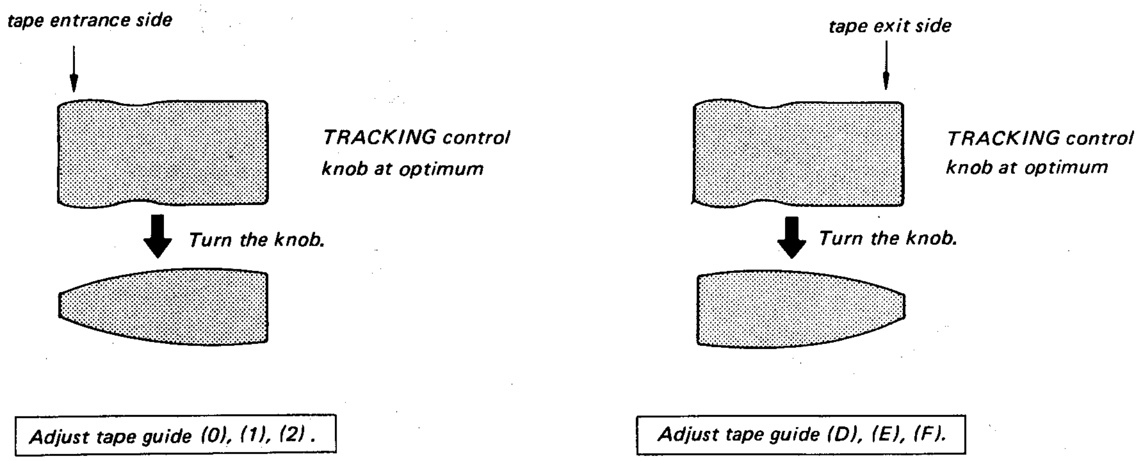

tape entrance side
TRACKING control knob at optimum
Turn the knob.
Adjust tape guide (0), (1), (2).
tape exit side
TRACKING control knob at optimum
Turn the knob.
Adjust tape guide (D), (E), (F).

*Fig. 3-47. Adjustment of tape path*

6. When the waveform at the tape entrance side is not flat as shown in Fig. 3-47 for the clockwise and counterclockwise turning of the TRACKING control knob from center, detent position, adjust the heights of tape guides (0), (1), and (2). When the waveform at the tape exit side is not flat, adjust the heights of tape guides (D), (E), and (F). The height adjustment must be performed so that the tape contacts the drum heads, and there is a minimum curl (not more than 2 mm) at the flange of each tape guide, the upper or lower flanges contact the tape as shown in Fig. 3-48, and the RF waveform is flat.

   **Note:** The construction of the ACE assembly enables the assembly to be adjusted so that its top plate is perpendicular to the face of the moving tape as a whole, but this "Zenith" adjustment is not necessary except after ACE assembly replacement.
   Since tape guide (D) regulates the movement of the tape around the drum exit, raise tape guide (D) about 0.5 mm before the adjustment of the tape path on the exit side. Then lower tape guide (D) to the point immediately before the RF waveform varies, and with less than 2 mm curl after the tape path adjustment.

### 3-19-2. Adjustment of Exit Side Tracking after ACE Assembly Replacement

1. The ACE assembly can be removed if the three screws shown in Fig. 3-49 are removed.

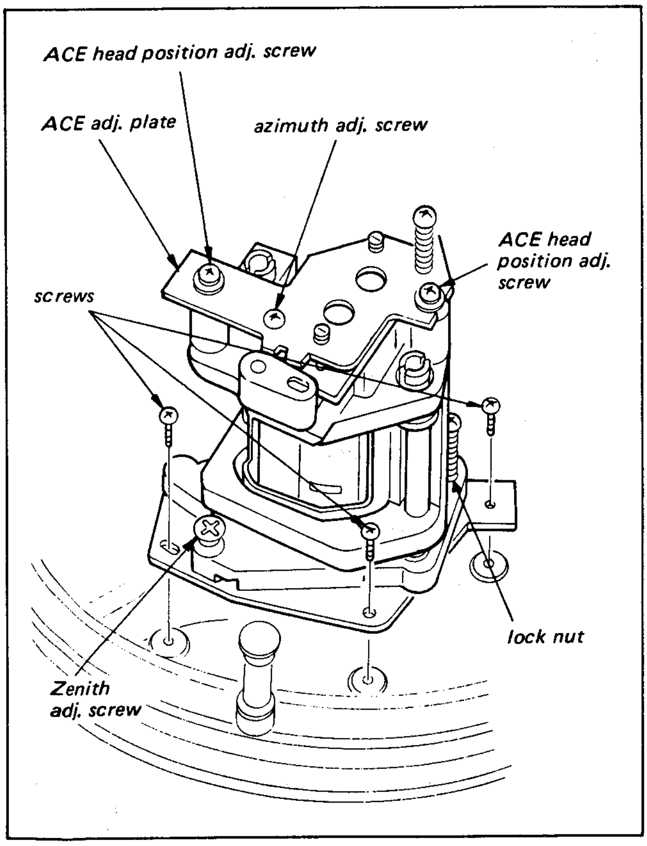


*Fig. 3-49. Removal of ACE assembly*

2. Perform the adjustment following Step 3 after the completion of the replacement.

3. Raise the tape guide (D) shown in Fig. 3-48 by 0.5 mm. (Turn the nut one turn.)

4. Play back the 1 MHz segment of the alignment tape (KR5-1J). Confirm that the RF wave output (see Fig. 3-46) satisfies the specification and there is a minimum curl (not more than 2 mm) on the tape edge contacting the tape guide. Confirm that the RF waveform varied from the flat state when the tape guides (E) and (F) are raised and adjust the heights of the tape guides so that the waveform output becomes flat.

5. When the waveform does not vary if the tape guides (E) and (F) are raised in Step 4 or when the waveform does not become flat if the tape guides are lowered, perform the adjustment, following the procedure below.

   (i) Loosen the lock nut shown in Fig. 3-49.

   (ii) Turn the zenith adjusting screw counterclockwise (↶) a little more than 30 degrees and turn it clockwise (↷) until the screw returns to the point 30 degrees counterclockwise from its original point.

   (iii) Perform Step 4 again. If the specification is not satisfied, perform Step 5 again. Since the ACE assembly was adjusted perpendicularly when assembled at the factory, do not turn the zenith adjusting screw more than 60 degrees to the right and left from the original position.

   (iv) After the adjustment, tighten the lock nut until a slight resistance for the tightening is felt and confirm that the specification in Step 4 is satisfied.

6. When there is an edge curl at the tape contacting the tape guide in Step 4, perform the adjustment, following the procedure below.

   (i) Loosen the lock nut shown in Fig. 3-49.

   (ii) Tighten the zenith adjusting screw clockwise only 15 degrees.

   (iii) Perform Step 4 again. If the specification is not satisfied, perform Steps 5 and 6 again, but do not turn the zenith adjusting screw to the right and left more than 60 degrees from its original position.

   (iv) Tighten the lock nut until a slight resistance is felt after the adjustment. Confirm that the specification in Step 4 is satisfied.

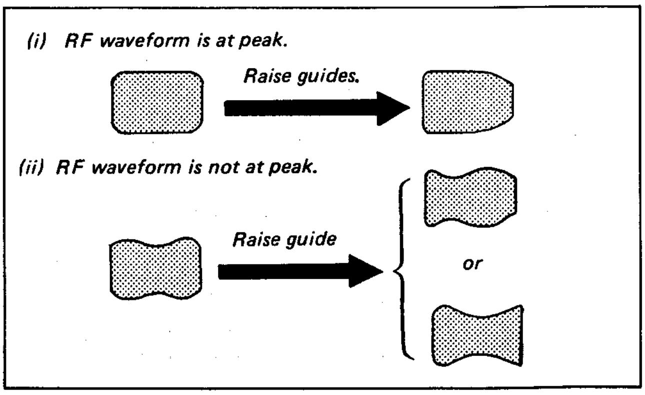


*Fig. 3-50. Adjustment of exit side tracking after ACE assembly replacement*

### 3-19-3. Audio Head Azimuth Adjustment

**[Connection of Relative Equipment]**

The connections of the equipments to the input/output terminals are shown in Fig. 3-51.

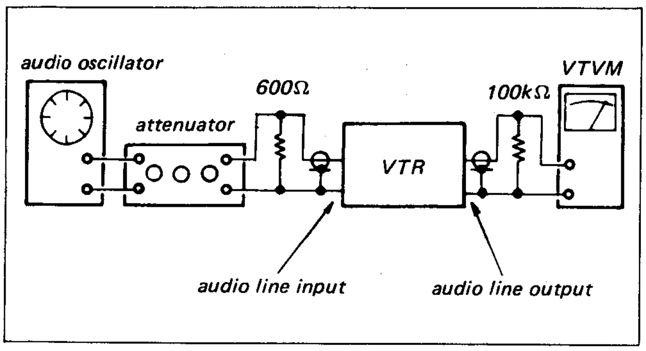

audio oscillator
600Ω
attenuator
VTR
100kΩ
VTVM
audio line input
audio line output

*Fig. 3-51. Connections*

1. Terminate the audio line output terminal with a 100 kΩ resistor and connect a VTVM.
2. Play back the 5 kHz signal segment of the alignment tape.
3. Adjust the azimuth adjustment screw on the audio head for a maximum VTVM reading. (See Fig. 3-51).

**Note:** Loosen azimuth adjustment screw before the adjustment and tighten it after the completion.

### 3-19-4. Position Adjustment of ACE Assembly

- This adjustment includes the mechanical head mounting position adjustment and the electrical tracking control center adjustment.
- The adjustment sequence is to perform the tracking control center adjustment and then the mechanical adjustment of the head mounting position. If this sequence is reversed, poor tracking occurs.

1. Connect a dual-trace oscilloscope as follows.

   CH-1 . . . . . . . . . . . . . TP-2005 (RF-2 board)
   CH-2 . . . . . . . . . . . . . TP-3406 (AS-3 board)
   Ext trigger . . . . . . . . . . TP-2003 (RF-2 board)

2. Play back the 1 MHz segment of alignment tape KR5-1J. (See Fig. 3-52).
3. Set the tracking control to the center, detent, position and confirm that the output waveform level is maximum and the 0 level point of the audio signal appears at the Bch waveform point as shown in Fig. 3-52. If the specification is not satisfied, perform the following Step 4.

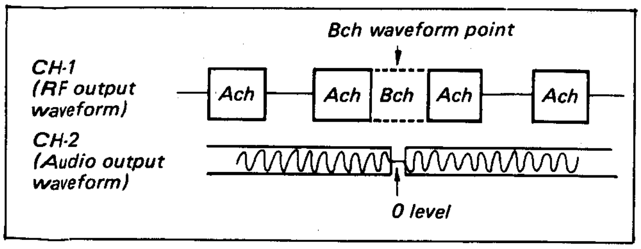

Bch waveform point
CH-1
(RF output waveform)
Ach
Ach
Bch
Ach
Ach
CH-2
(Audio output waveform)
0 level

*Fig. 3-52. Position adjustment of ACE assembly (1)*

4. Perform the tracking control center adjustment. [Refer to section 4-3-2(2)].
5. Set the TRACKING control knob to its center detent point and play back the 1 MHz segment of the alignment tape (KR5-1J).
6. Loosen the two position adjusting screws of the ACE head and adjust the cut-out section of section A for maximum RF output waveform and a 0 level of audio signal at the Bch waveform point. (See Fig. 3-52.)

   **Note:** Perform the adjustment so that the center of the cut-out section of the A section will almost match the center of the round hole.

7. Play back the 1 MHz segment of the alignment tape and confirm the proper picture appearance.
8. Tighten the position adjusting screw of the ACE head.

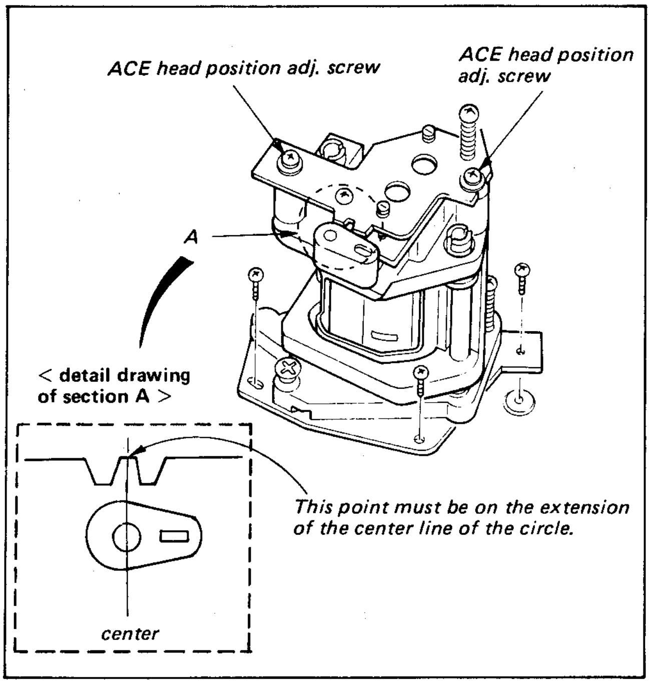

ACE head position adj. screw
ACE head position adj. screw
A
< detail drawing of section A >
This point must be on the extension of the center line of the circle.
center

*Fig. 3-53. Position adjustment of ACE assembly (2)*

### 3-19-5. Video Head Dihedral Adjustment

- Generally this adjustment is not necessary except after the video head disk replacement.

  **Note:** The dihedron of a video head disk for replacement purposes was adjusted precisely with a microscope at the factory and the readjustment is usually not necessary.

- The ACE assembly position adjustment has been completed prior to this dihedral adjustment.
- The judgment of the video head dihedron must be performed in the condition that the monoscope signal segment of the alignment tape (KR5-1J) is played back and the TRACKING control knob is set to the center detent position. (See Fig. 3-54.)

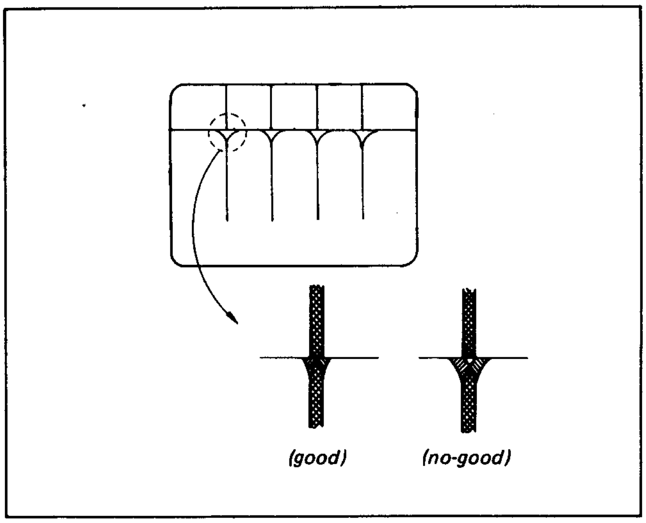

(good)
(no-good)

Fig. 3-54.

- When the dihedron is no-good, the preparation of the video head dihedral adjustment is to install two dihedral adjusting screws in the holes close to the small mark (•) shown in Fig. 3-55 and tighten them until the screw heads are level with the top surface of the video head disk. (If the screws are not tightened until their heads become level with the surface, the upper drum of the video head disk is caught by the adjusting screw heads and the video head disk cannot rotate. If the screws are tightened excessively, the head base is moved and the dihedral distortion becomes larger.)

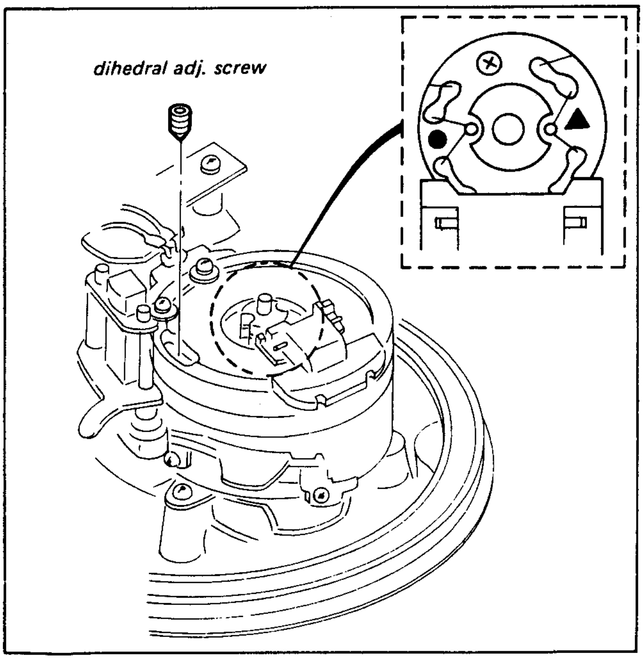

dihedral adj. screw

Fig. 3-55.

**When the dihedron is no-good;**

(1) When the split becomes small for the clockwise turn of the TRACKING control knob, the B head shifts by C in the arrow direction as shown in Fig. 3-56 and is tracing the magnetic pattern on the tape. The adjusting screw in adjustment hole E shown in the figure must be tightened further to shift the B head in the left direction until the good dihedron shown in Fig. 3-54 is obtained.
Set the TRACKING control knob to the center detent point.

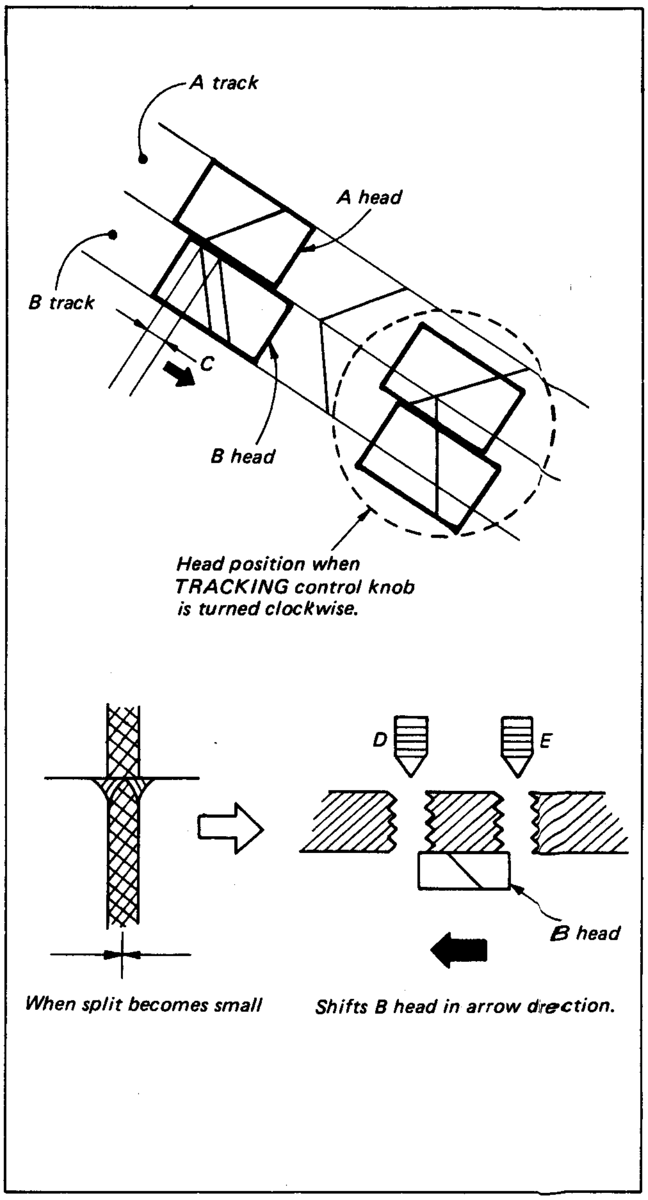

A track
A head
B track
C
B head
Head position when TRACKING control knob is turned clockwise.
D
E
B head
When split becomes small
Shifts B head in arrow direction.

Fig. 3-56.

(2) When the split becomes large for the clockwise turn of the TRACKING control knob, the B head shifts by C in the arrow direction as shown in Fig. 3-57 and is tracing the magnetic pattern. The adjusting screw in adjustment hole D shown in the figure, must be tightened further to shift the B head in the right direction until the good dihedron shown in Fig. 3-54 is obtained.
Set the TRACKING control knob to the center detent point.

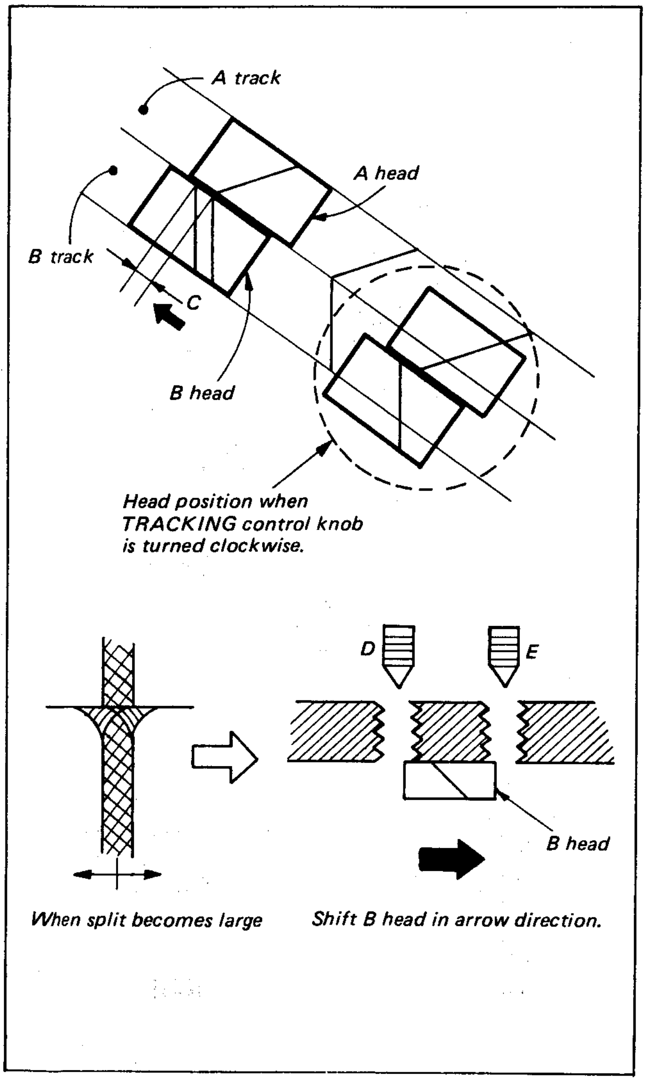

A track
A head
B track
C
B head
Head position when TRACKING control knob is turned clockwise.
D
E
B head
When split becomes large
Shift B head in arrow direction.

*Fig. 3-57.*

(3) Remove the adjusting screws after the completion of the adjustment and check the dihedron again.

# SECTION 4
# ELECTRICAL ALIGNMENT

All the electrical alignment can be performed by using the **equipment mentioned below, the alignment tape, and the SECAM** colour bar signal (100%).

**[Equipment Required]**

(1) Colour Monitor TV

(2) Oscilloscope, Dual-trace, Bandwidth . . . more than 10 MHz with delay mode

(3) Frequency Counter

(4) **SECAM Colour-Bar Generator**

(5) Digital voltmeter

(6) VOM (20 KΩ/V)

(7) Audio Signal Generator

(8) Vectorscope

(9) Attenuator

(10) Alignment Tape, type: **KR5-1J, Code No. 8-969-996-03**

(11) Alignment Tool (Adjusting screwdriver for semi-fixed resistors and coils)
Jig No. SL-0001, Code No. J-6080-001-A

**[Setup for Alignment]**

The antenna should be connected correctly to the antenna input terminal of the videocassette recorder.

It is important that the video output signal satisfies the specification because the telecast signal received by the incorporated tuner of the videocassette recorder is utilized as the adjustment signal of the machine. The incorporated tuner should be set to the channel with the best reception. The video signal should be checked **with an oscilloscope connected to video in terminal on the YC-12 board. Verify that the sync signal amplitude is approx. 0.3 Vp-p and the video signal amplitude is approx. 0.7 Vp-p at peak. Adjust the fine tuning while observing the signal and the TV screen so that the burst signal amplitude becomes approx. 0.3 V ± 0.1 Vp-p. Also confirm that there is no spikes observed at the sync signal portion.** (See Fig. 4-1.)

The video (colour bar) signal for the alignment is shown in Fig. 4-1.

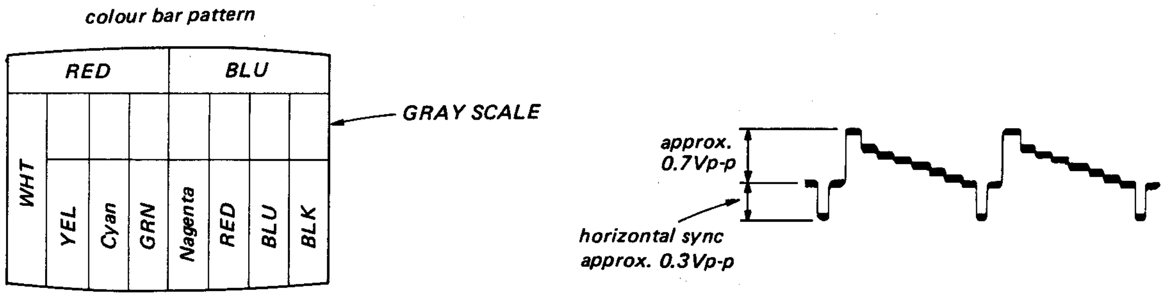


*Fig. 4-1. Video (colour bar) signal*

**[Alignment Tape]**

**KR5-1J**

| | Video signal | Audio signal | Playing time | Use for |
|---|---|---|---|---|
| 1. | Colour bars | 3 kHz – 5 dB | 5 min | General performance, tape speed checks, switching position adjustment. |
| 2. | Monoscope | 333 Hz – 25 dB | 5 min | Video head dihedral, audio level adjustment. |
| 3. | RF sweep | 5 kHz – 25 dB | 5 min | Video, audio frequency characteristics, audio azimuth adjustment<br>marker: 1, 2, 3.58, 4.5, 5.2 MHz |
| 4. | Tracking<br>1 MHz (CH-A)<br>*1 (Channel B is inserted in every 3 frames.) | 1 kHz – 5 dB<br>*2 (Signal is dropped out in the positions where channel B is inserted.) | 5 min | Tracking, Audio height adjustments CTL Position check<br>(Check if *1 and *2 are the same position.) |

**[Alignment Tool for Semi-fixed Variable Resistors and Coils]**

Semi-fixed variable resistors and inductances should be adjusted with the alignment tool exclusively prepared for the adjustment of the components. A common screwdriver is too large for adjusting the components from the conductor side of a printed cricuit board.

The metal blade of the alignment tool is used for variable resistors and trimmer capacitors and the plastic tip is used for variable inductances.

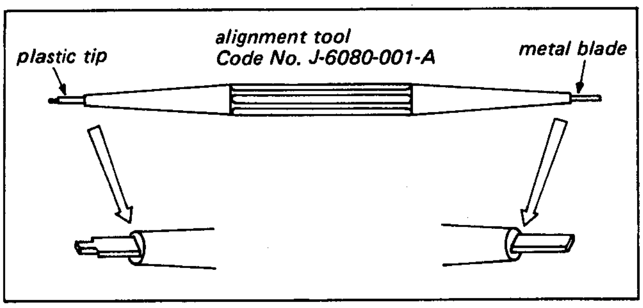

alignment tool
Code No. J-6080-001-A
plastic tip
metal blade

*Fig. 4-2. Alignment tool*

**[Required Levels and Impedances of Input and Output]**

VIDEO

Input ...........VIDEO IN: BNC connector
1.0 Vp-p, 75 ohms
unbalnced, sync negative

Output ........ VIDEO OUT: BNC connector
1.0 Vp-p, 75 ohms
unbalanced, sync negative

AUDIO

Input .......... AUDIO IN: Phono connector, 47 kohms, −10 dBs
MIC: mini jack, −60 dBs, suitable for microphone with 600-ohm impedance

Output ......... AUDIO OUT: Phono connector, Less than 10 kohms, −5 dBs (47 kohm load), unbalanced

**[Colour Bar Signal]**

The 100% colour bar signal recorded on the Alignment tape is shown in Fig. 4-3.

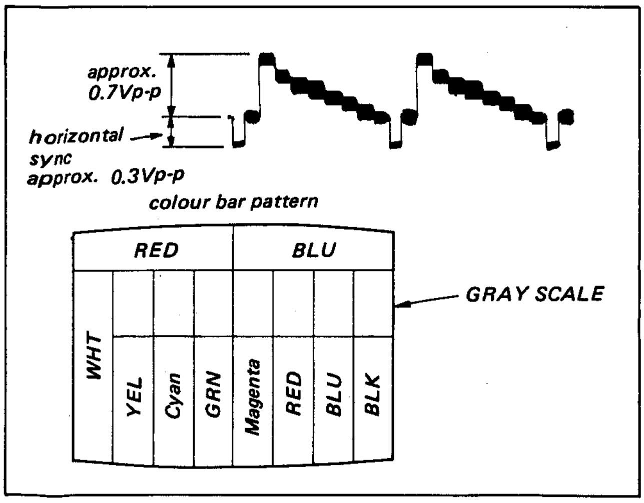
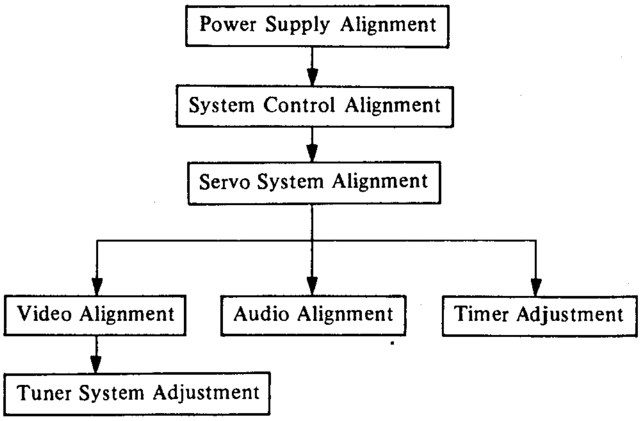

approx. 0.7Vp-p
horizontal sync
approx. 0.3Vp-p
colour bar pattern
RED
BLU
GRAY SCALE
WHT
YEL
Cyan
GRN
Magenta
RED
BLU
BLK

*Fig. 4-3. Colour bar signal recorded on the alignment tape*

**[Alignment Sequence]**

The alignment should be performed following the sequence below.


Power Supply Alignment
System Control Alignment
Servo System Alignment
Video Alignment
Audio Alignment
Timer Adjustment
Tuner System Adjustment

## 4-1. POWER SUPPLY ALIGNMENT AND CHECK

1. Output Voltage Check (FS-6 board)

**Note:** Set up the E-E mode.

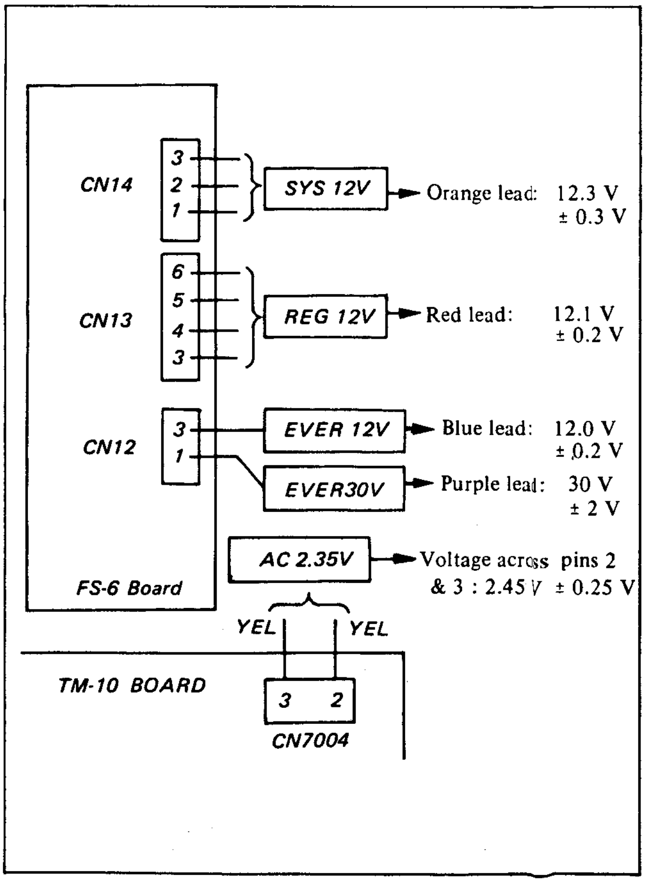

CN14
3
2
1
SYS 12V
Orange lead: 12.3 V ± 0.3 V
CN13
6
5
4
3
REG 12V
Red lead: 12.1 V ± 0.2 V
CN12
3
1
EVER 12V
Blue lead: 12.0 V ± 0.2 V
EVER30V
Purple lead: 30 V ± 2 V
AC 2.35V
Voltage across pins 2 & 3 : 2.45 V ± 0.25 V
FS-6 Board
YEL
YEL
TM-10 BOARD
3 2
CN7004

*Fig. 4-1-1.*

2. REG 12V Adjustment

This adjustment should be executed after the replacement of IC1, R210, through R213, and RV201.

**Caution:** Discharge C108 with a resistor of 1kΩ (more than 2W). If it is not discharged, you will get a shock.

(1) Remove CN0010 off the FS-6 board.

(2) Connect the VOM at the point shown in Fig. 4-1-2.

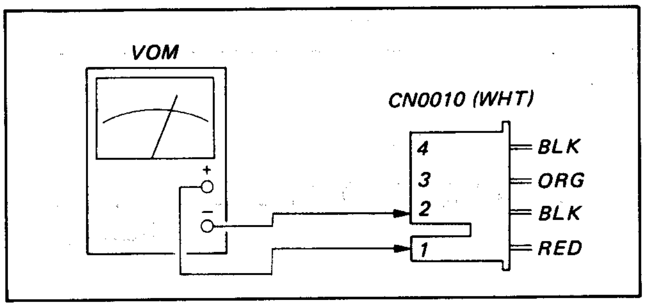


*Fig. 4-1-2.*

(3) Adjust RV201 for 12.1 ± 0.1 V.

(4) Connect CN0010 as it was.

(5) Set up the PLAY mode.

(6) Check that the VOM reading is with in the value in step (3). If it is not, readjust RV201.

3. EVER 12V Adjustment

This adjustment should be executed after the replacement of R220 through R222, RV202, and D209.

**Caution:** Discharge C108 with a resistor of 1kΩ (more than 2W). If it is not discharged, you will get a shock.

(1) Remove CN0011 off the FS-6 board and CN7004 off the TM-11 board.

(2) Connect the VOM at the point shown in Fig. 4-1-3.

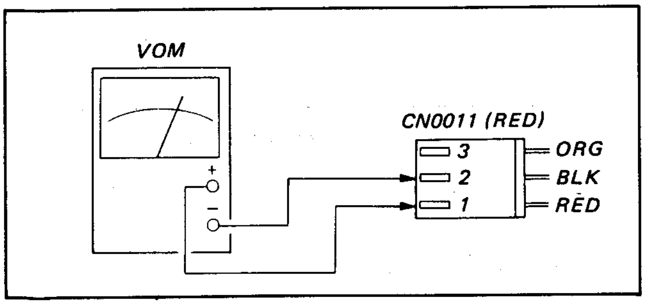


*Fig. 4-1-3.*

(3) Adjust RV202 for 12 V ± 0.1 V.

(4) Connect CN0011 and CN7004 as they were.

(5) Place the VTR into an optional mode.

(6) Check the VOM reading is within the value in Step (3). If it is not, adjust RV202.

## 4-2. SYSTEM CONTROL ALIGNMENT AND CHECK (SY-10 & SY-11 board)

1. Clock Oscillating Frequency Adjustment (SY-10 board)

(1) Connect the frequency counter to pin 42 of IC502.

**Note:** The input impedance of the frequency counter should be more than 10 MΩ.

(2) Adjust T501 for 400 kHz ± 0.5 kHz. (See Fig. 4-2-1.)

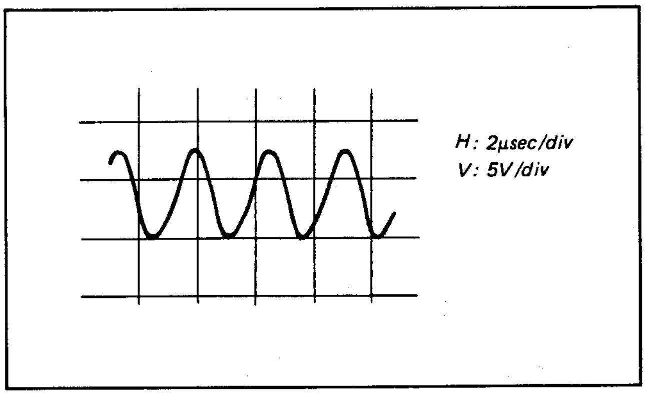


*Fig. 4-2-1. Adjustment of clock oscillating frequency*

2. Clock Oscillating Frequency Adjustment (SY-11 board)

(1) Connect the frequency counter to pin 43 of IC06.

**Note:** The input impedance of the frequency counter should be more than 10 MΩ.

(2) Adjust T1 for 400 kHz ± 0.5 kHz. (See Fig. 4-2-1.)

3. Clock Oscillating Frequency Adjustment (SY-11 board)

(1) Connect the frequency counter to pin 42 of IC07.

**Note:** The input impedance of the frequency counter should be more than 10 MΩ.

(2) Adjust T2 for 400 kHz ± 0.5 kHz. (See Fig. 4-2-1.)

4. Threading Check

(1) Load a cassette.

(2) Check that the threading is performed.
Threading time: about 3 seconds

5. Unthreading Check

(1) Press the EJECT button.

(2) Check that the unthreading is performed as soon as the EJECT lamp turns on, the lamp turns off after the completion of the unthreading, and the cassette lift assembly rises.
Unthreading time: about 4 seconds

6. Auto-Rewind Check

(1) Check that the auto-rewind is done automatically so that the tape is rewound at the tape end in the F.FWD, REC, PB, or CUE mode after the end alarm sounds 10 seconds if the END ALARM switch is in the on position.

## 4-3. SERVO SYSTEM ALIGNMENT

### 4-3-1. Drum Servo System Adjustment

1. Drum Free Speed Adjustment (AS-3 board)

   (1) Set up the REC mode.
   (2) Connect the oscilloscope as follows.

   CH-1 . . . . . pin 1 of IC1
   CH-2 . . . . . pin 7 of IC1

   (3) Confirm that the waveform locks as shown in Fig. 4-3-1.

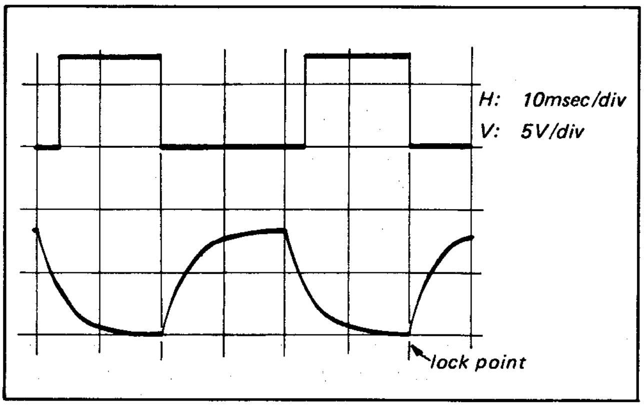


*Fig. 4-3-1. Drum free speed adjustment*

   (4) Connect the CH-1 probe of the oscilloscope to TP2 (pin 10 of IC1).

   Input range: DC

   (5) Adjust RV10 for 5.2 V ± 0.3 V. (See Fig. 4-3-2.)

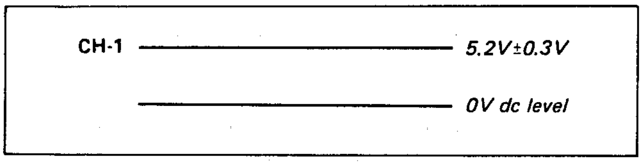


*Fig. 4-3-2. Drum free speed adjustment*

2. **RF Switching Position Adjustment (YC-12, RF-2, & AS-3 boards)**

   (1) Play back the coulor bar segment of the alignment tape.

   (2) Connect the oscilloscope to TP5 on the RF-2 board.

   (3) Adjust the TRACKING knob for maximum output. (See Fig. 4-3-3.)

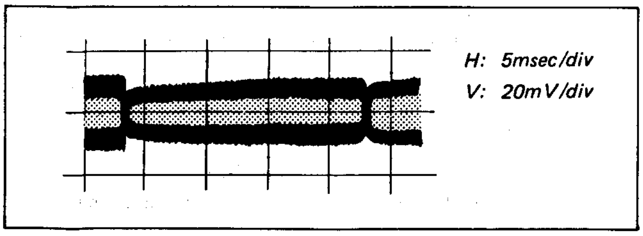


*Fig. 4-3-3. RF output level adjustment*

   (4) Connect the oscilloscope as follows.

   CH-1 . . . . . TP1/AS-3 board
   CH-2 . . . . . Emitter of Q21/YC-12 board

   (5) Adjust RV2 on the AS-3 board so that the phase difference between the falling section of the CH-1 waveform and the vertical sync signal of the CH-2 video signal are 7 H ± 2 H. (See Fig. 4-3-4.)

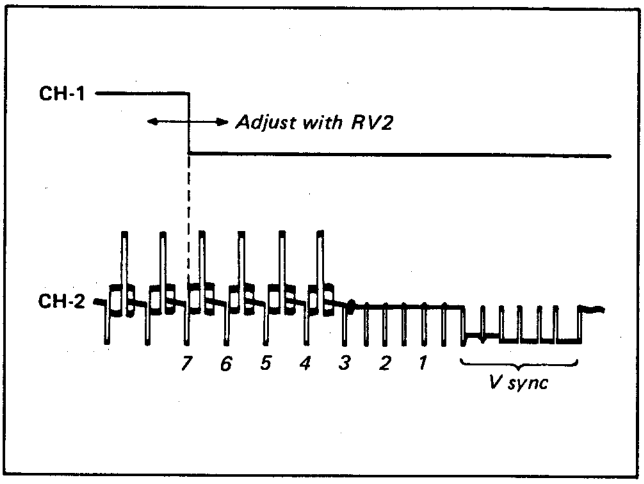


*Fig. 4-3-4. RF switching position adjustment (1)*

   (6) Adjust RV1 on the AS-3 board so that the phase difference between the rising section of the CH-1 waveform and the vertical sync signal of the CH-2 video signal are 7 H ± 2 H. (See Fig. 4-3-5.)

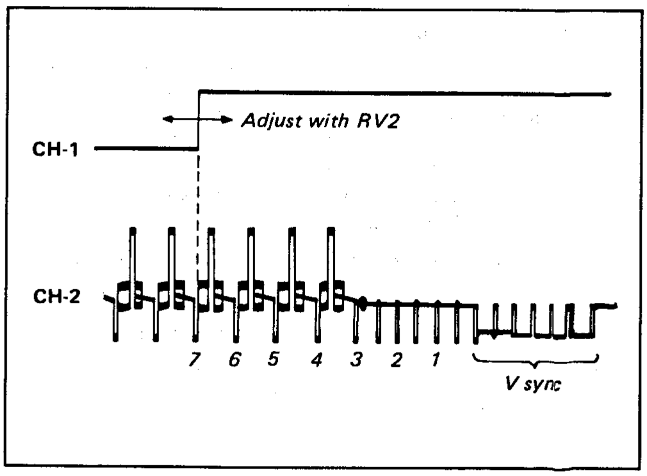


*Fig. 4-3-5. RF switching position adjustment (2)*

3. **Record-Servo Lock Phase Adjustment (YC-12 & AS-3 boards)**

   (1) Record a video signal.

   (2) Connect the oscilloscope as follows.

   CH-1 . . . . . TP1/AS-3 board
   CH-2 . . . . .,pin 20 of IC1/YC-12 board

   (3) Adjust RV3 on the AS-3 board so that the phases of the falling section of the CH-1 waveform and the vertical sync signal of the CH-2 video signal are 7 H ± 2 H. (See Fig. 4-3-6.)

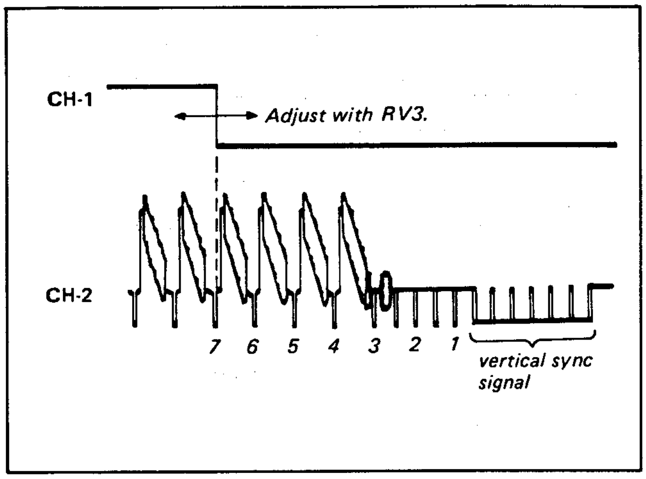

CH-1
Adjust with RV3.
CH-2
7
6
5
4
3
2
1
vertical sync signal

*Fig. 4-3-6. Record-servo lock phase adjustment*

4. Picture Search (High-Speed Picture) (AS-3 board)

   (1) Record a video signal.

   (2) Play back the recorded segment.

   (3) Connect the oscilloscope to pin 10 of IC7 on the **YC-12 board.**

   (4) Position the positive-going edge of the waveform at the exact center of the oscilloscope scale. (See Fig. 4-3-7.)

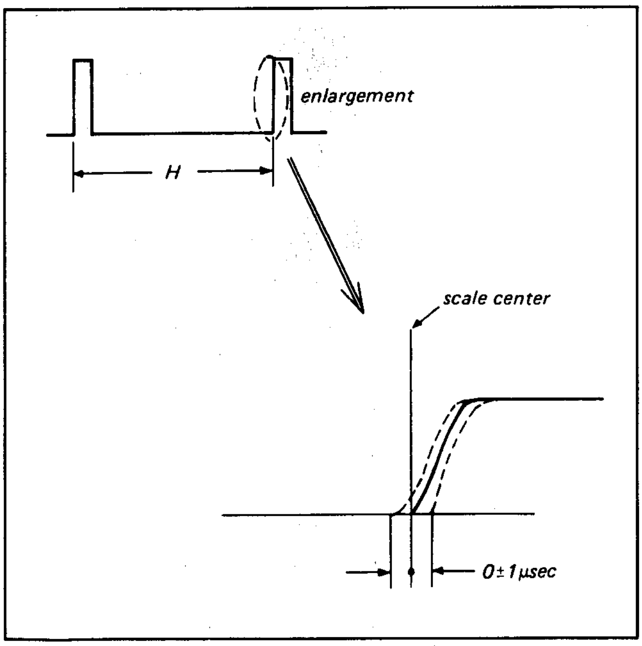

enlargement
H
scale center
0±1μsec

*Fig. 4-3-7. Picture search free speed adjustment*

   (5) Set up the CUE mode.

   (6) Adjust RV11 so that the fluctuation of the rising of the waveform is within 0 ± 1 μsec. for the scale center.

   (7) Set up the REVIEW mode.

   (8) Adjust RV12 so that the fluctuation of the rising of the waveform is within 0 ± 1 μsec. for the scale center.

### 4-3-2. Capstan Servo System Alignment

1. Capstan Free Speed Adjustment (AS-3 board)

   (1) Play back the colour bar segment of the alignment tape.

   (2) Connect the oscilloscope as follows.
   CH-1 ..... pin 19 of IC2
   CH-2 ..... pin 20 of IC2

   (3) Adjust RV8 for the phase lock shown in Fig. 4-3-8.)

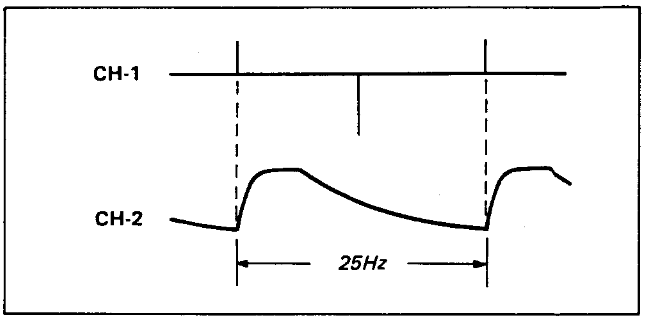

CH-1
CH-2
25Hz

*Fig. 4-3-8. Phase lock*

   (4) Connect the oscilloscope to TP4.
   Input range: DC range

   (5) Adjust RV8 for 5.5 V ± 0.3 V.

   (6) Play back the coulor bar signal in the TRIPLE speed.

   (7) Adjust RV9 for 5.5 V ± 0.3 V.

2. Tracking Control Center Adjustment (AS-3 board)

   (1) Set the TRACKING knob to the center detent position.

   (2) Play back the colour bar signal segment of the alignment tape.

   (3) Connect the oscilloscope as follows.
   CH-1 ..... TP11
   CH-2 ..... TP6

   (4) Adjust RV4 so that the phases of the falling sections of the waveforms become the same. (See Fig. 4-3-9.)

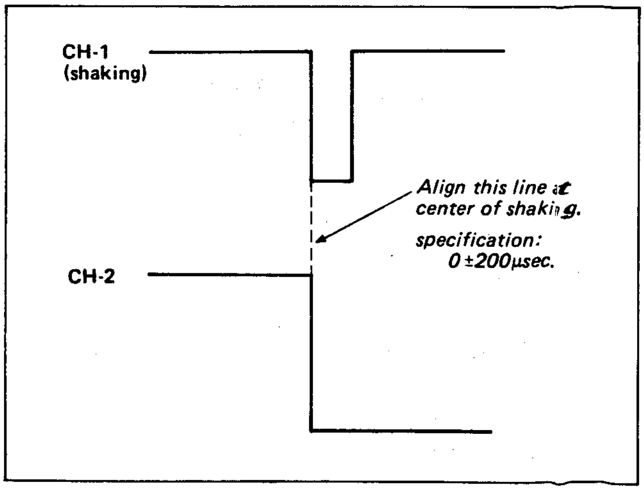

CH-1 (shaking)
Align this line at center of shaking.
specification: 0±200μsec.
CH-2

*Fig. 4-3-9. Tracking control center adjustment*

3. Triple Speed Noise Position Adjustment (AS-3 board)
   (1) Record an optional signal.
   (2) Set the TRACKING knob to the center detent position.
   (3) Play back the recorded segment in the TRIPLE speed.
   (4) Adjust RV5 so that the noise disappears from the monitor TV screen. (See Fig. 4-3-10.)

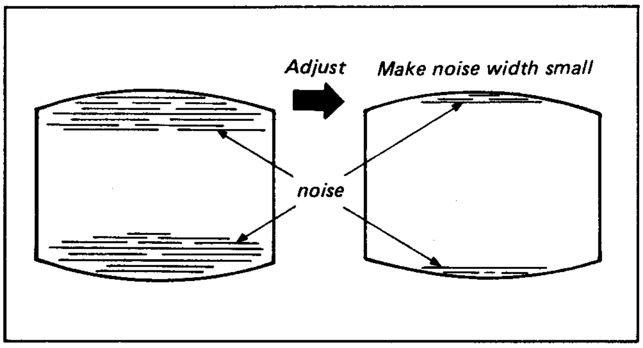


*Fig. 4-3-10. Triple speed noise position adjustment*

### 4-3-3. Slow Speed Circuit Adjustment

1. Slow Speed Adjustment (AS-3 board)
   (1) Set up the slow-motion mode.
   (2) Connect the oscilloscope to the emitter of Q6.
   (3) Adjust RV6 for a pulse width of 18 msec ± 1 msec. (See Fig. 4-3-11.)

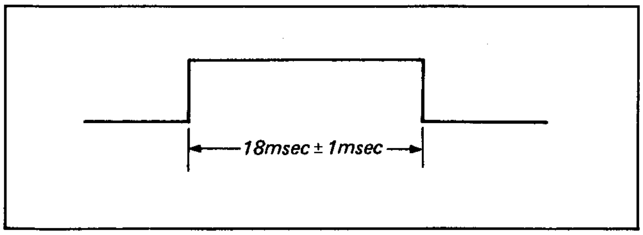


*Fig. 4-3-11. Slow speed adjustment*

## 4-4. VIDEO SYSTEM ALIGNMENT (CF-2, YC-12 AND RF-2 BOARDS)

**[CF-2 Board]**

1. Burst Gate Pulse Width Adjustment
   (1) Supply the VTR with the colour bar signal and set up the E-E mode.
   (2) Connect the oscilloscope probe (A) to the point between R28 and R29, and probe (B) to the VIDEO OUT.
   (3) Adjust RV2 and RV4 so that the burst gate pulse is as shown in Fig. 4-4-1.

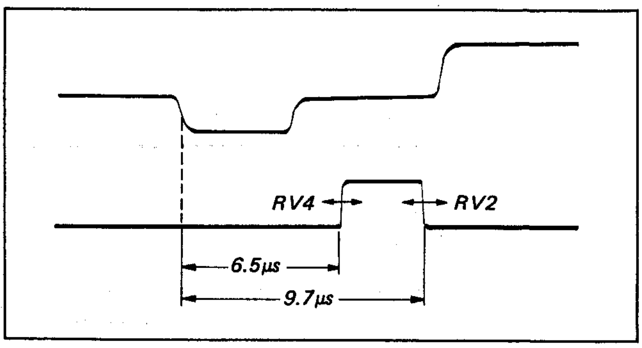


*Fig. 4-4-1. Burst gate pulse*

2. DC Bias Adjustment
   (1) Supply the VTR with the colour bar signal and set up the E-E mode.
   (2) Connect the oscilloscope to pin 13 of IC7.
   (3) Adjust RV5 so that the waveform is as shown in Fig. 4-4-2.

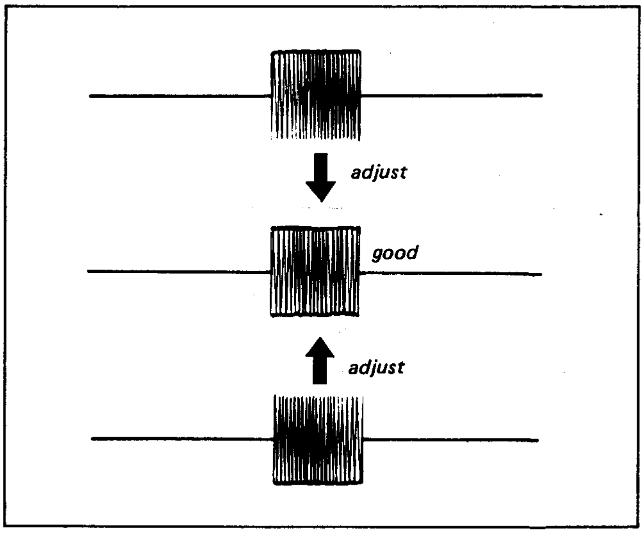


*Fig. 4-4-2. DC bias adjustment*

3. HID Discriminator Frequency Adjustment
   (1) Supply the VTR with the colour bar signal and set up the E-E mode.
   (2) Connect the oscilloscope to pin 11 of IC7.
   (3) Adjust LV4 so that the waveform is as shown in Fig. 4-4-3.

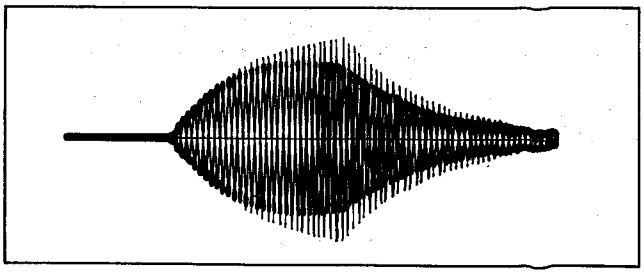


*Fig. 4-4-3. HID discriminator frequency adjustment*

4. Phase shifter Adjustment

   (1) Supply the VTR with the colour bar signal and set up the E-E mode.

   (2) Connect the oscilloscope probe (A) to pin 9 of IC1, and probe (B) to VIDEO OUT.

   (3) Adjust RV3 so that the beginning position of boost strap waveform for shifter is at 6.2μs.

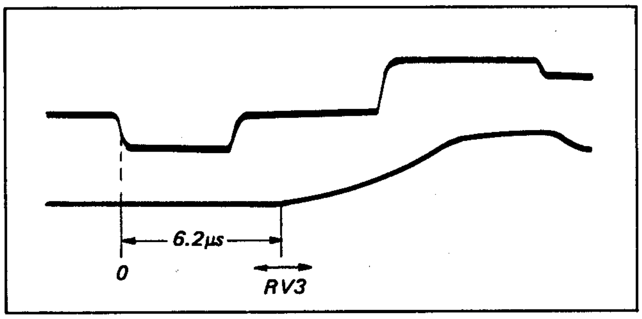


*Fig. 4-4-4. Phase shifter adjustment*

5. Burst Signal Adjustment

   (1) Supply the VTR with the colour bar signal and set up the E-E mode.

   (2) Connect the oscilloscope to pin 1 of IC6.

   (3) Adjust LV1 for maximum level, and make sure that envelope of the waveform is modulated as shown in Fig. 4-4-5.

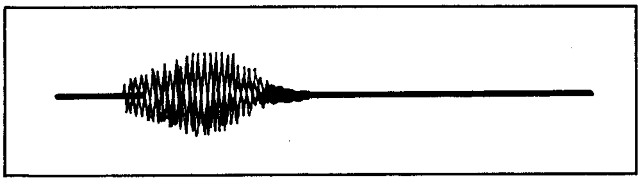


*Fig. 4-4-5. Envelope waveform*

   (4) Turn RV1 fully clockwise viewed from component side.

   (5) Readjust the LV1 for maximum level.

6. Injection Oscillator Adjustment

   (1) Supply the VTR with the colour bar signal and set up the E-E mode.

   (2) Connect the oscilloscope to collector of Q4.

   (3) Make sure that injection level is 5–6V and does not saturate as shown in Fig. 4-4-6.

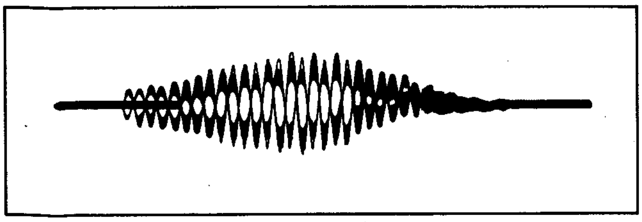


*Fig. 4-4-6. Injection oscillator (1)*

   (4) Short-circuit between collector and emitter of Q14 with the jumper.

   (5) Connect the frequency counter as shown in Fig. 4-4-7.

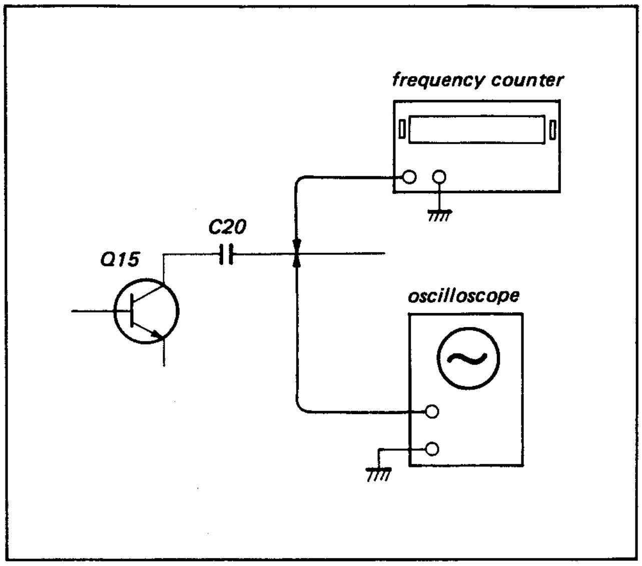


*Fig. 4-4-7. Injection oscillator (2)*

   (6) Adjust LV2 for 4.40625 MHz ± 1 kHz reading and LV3 for maximum.

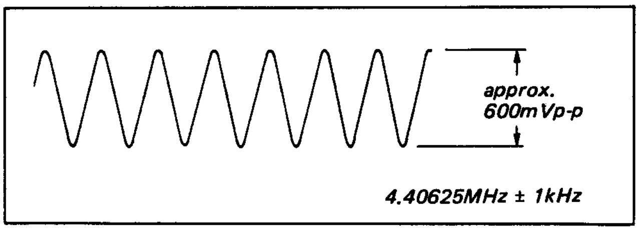


*Fig. 4-4-8. Injection oscillator (3)*

   (7) Connect the oscilloscope as shown in Fig. 4-4-7.

   (8) Remove the jumper in step (4).

   (9) Make sure that the waveform is as shown in Fig. 4-4-9.

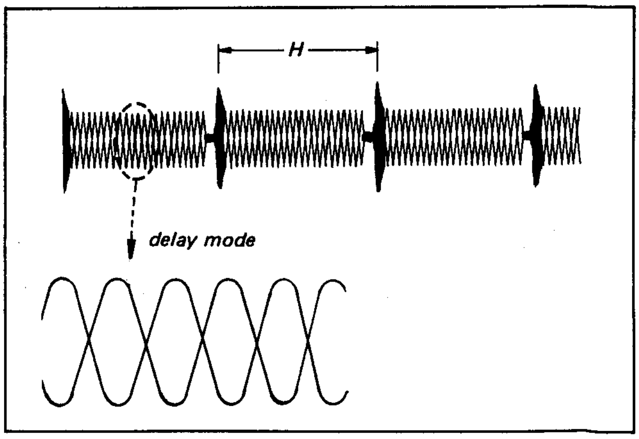


*Fig. 4-4-9. Injection oscillator (4)*

7. Bell Filter Adjustment

(1) Supply the VTR with the colour bar signal and set up the E-E mode.

(2) Connect the oscilloscope to pin 15 of IC5 on the YC-12 board, and to collector of Q11 on the CF-2 board.

**Note:** The waveform of pin 15 of IC5 is low level (approx. 0.1Vp-p), so earth terminal of oscilloscope probe should be terminated to ground pattern.

(3) Adjust LV5 and T1 so that the two waveforms become the same as shown in Fig. 4-4-10.

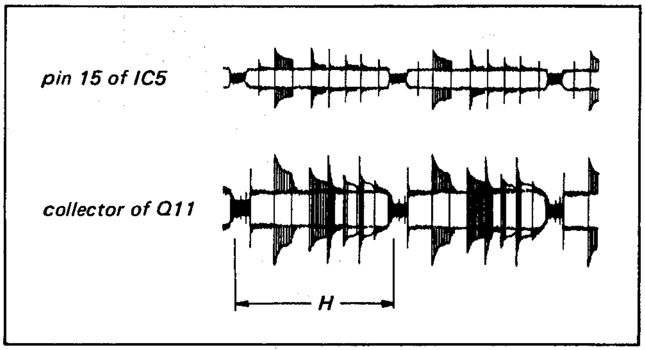


*Fig. 4-4-10. Bell filter adjustment*

(4) Play back the colour bar signal segment of the alignment tape.

(5) Readjust the LV5 and T1 so that colour saturation is not taken place.

**[YC-12 Board]**

1. SYNC AGC Preset Adjustment

(1) Supply the VTR with the colour bar signal and set up the E-E mode.

(2) Check the following points with the oscilloscope.
IC1 Pin 3 . . . Sync . . . . . . . . . . . . . Approx. 6 Vp-p
Pin 4 . . . Burst flag . . . . . . . . . Approx. 4 Vp-p
Pulse width: Approx. 4 μsec
Pin 5 . . . AGC CONT . . . . . . . . Approx. 1.4 Vdc
Pin 17 . . MONO/COLOUR . . . . Approx. 0 Vdc

(3) Connect the oscilloscope to pin 24 of IC1.

(4) Adjust RV7 for the sync signal level of 300mV ± 12mVp-p. (See Fig. 4-4-11.)

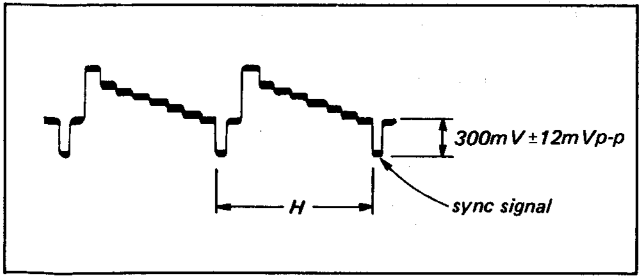


*Fig. 4-4-11. Lebel adjustment of sync signal*

2. Colour E-E Level Adjustment

(1) Supply the colour bar signal and set up the E-E mode.

(2) Connect the oscilloscope to pin 22 of IC1.

(3) Adjust RV1 for the sync signal level of 300 mV ± 15 mVp-p. (See Fig. 4-4-12.)

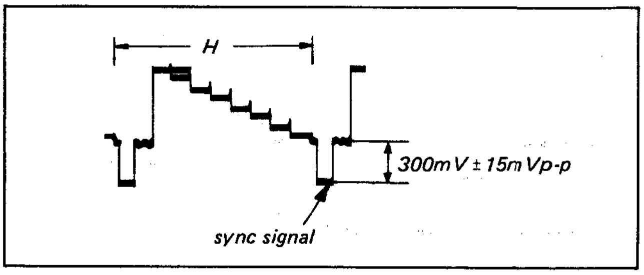


*Fig. 4-4-12. Level adjustment of sync signal*

3. Peak AGC (E-E Video Output Level) Adjustment

(1) Supply the VTR with the colour bar signal and set up the E-E mode.

(2) Connect the oscilloscope to pin 24 of IC1.

(3) Adjust RV7 for maximum output level of the video signal and then adjust RV2 so that the output level of the video signal becomes 1.1 V ± 0.05 Vp-p. (See Fig. 4-4-13.)

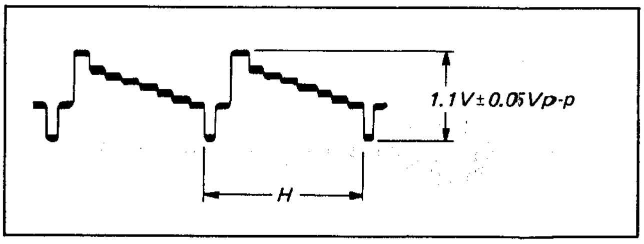


*Fig. 4-4-13. Peak AGC adjustment*

4. SYNC AGC Adjustment

(1) Supply the VTR with the colour bar signal and set up the E-E mode.

(2) Connect the oscilloscope to pin 24 of IC1.

**Note:** The voltage at pin 17 of IC1 is aproximately 0 Vdc

(3) Adjust RV7 so that the sync signal leve is 300 mV ± 12 mVp-p. (See Fig. 4-4-14.)

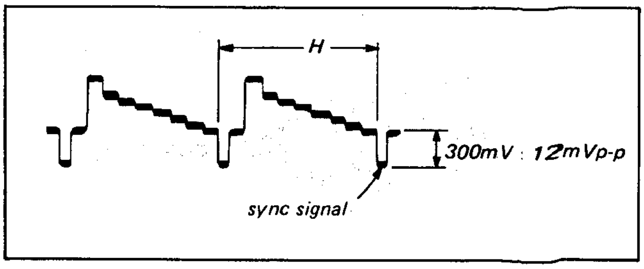


*Fig. 4-4-14. Sync AGC adjustment*

5. Compress Adjustment

(1) Do not supply the VTR with any signal and set up the E-E mode.

(2) Connect the digital voltmeter to the points shown in Fig. 4-4-15.

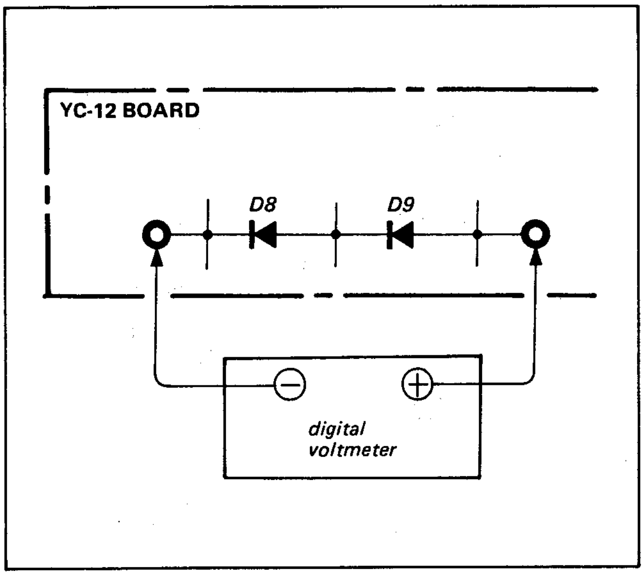

YC-12 BOARD
D8
D9
digital voltmeter

Fig. 4-4-15. Measurement points

(3) Adjust RV8 for 0.454 Vdc.

6. White Clip Adjustment

(1) Supply the VTR with the colour bar signal and set up the E-E mode.

(2) Connect the oscilloscope to collector of Q34.

(3) Adjust RV10 so that the signal tip (white peak) is 220% ± 5%. (See Fig. 4-4-16.)

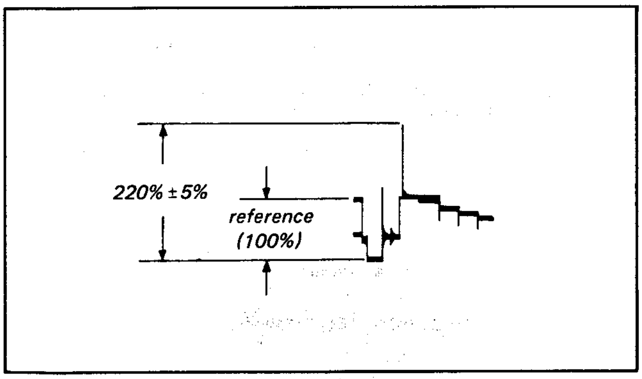

220% ± 5%
reference (100%)

Fig. 4-4-16. White clip adjustment

7. Dark Clip Adjustment

(1) Supply the VTR with the colour bar signal and set up the E-E mode.

(2) Connect the oscilloscope to collector of Q34.

(3) Adjust RV9 so that the signal tip (dark peak) is 170% ± 5%. (See Fig. 4-4-17.)

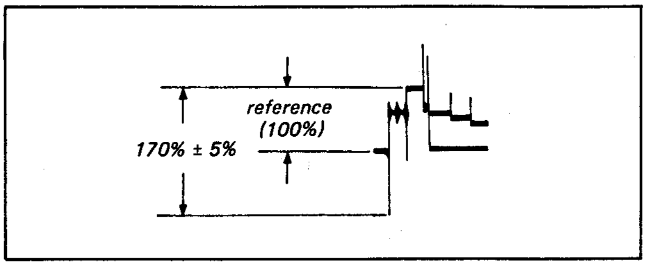

reference (100%)
170% ± 5%

Fig. 4-4-17. Dark clip adjustment

8. Expand Adjustment

(1) Do not supply the VTR with any signal and set up the E-E mode.

(2) Connect the digital voltmeter to the points shown in Fig. 4-4-18.

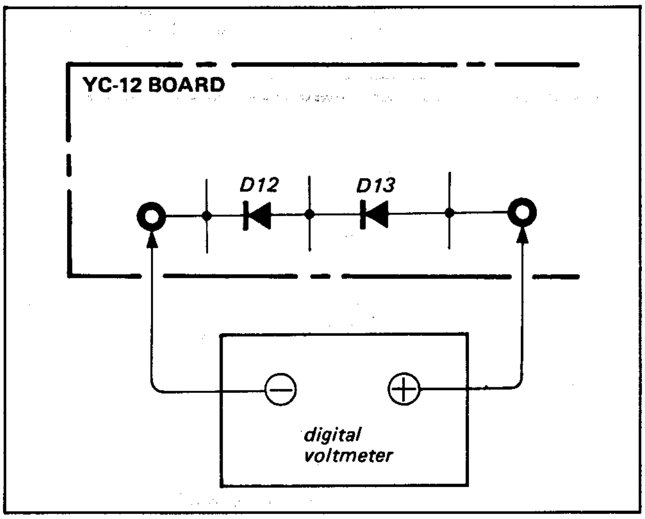

YC-12 BOARD
D12
D13
digital voltmeter

Fig. 4-4-18. Measurement points

(3) Adjust RV14 for 0.52 Vdc.

9. AFC Adjustment

(1) Supply the VTR with a video signal and set up the E-E mode.

(2) Connect the oscilloscope to pin 5 of IC6.
TRIG: EXT (IC1-4 pin, H.Sync)

(3) Adjust RV22 so that the lock point is the center of the trapezoidal waveform. (See Fig. 4-4-19.)

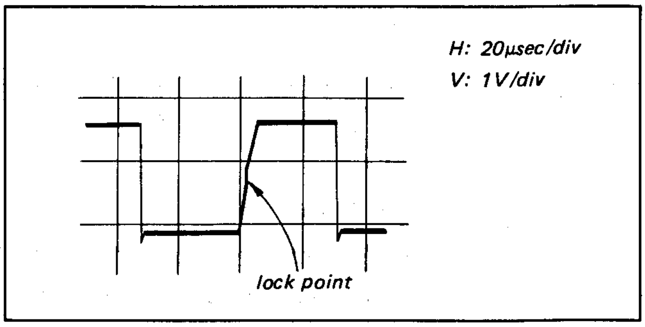

H: 20µsec/div
V: 1V/div
lock point

Fig. 4-4-19. AFC adjustment

10. AFC Offset Adjustment

(1) Supply the VTR with the video signal and set up the RECORD mode.

(2) Connect the oscilloscope to pin 5 of IC6.
TRIG: EXT (TP3, RF SW PULSE, on RF-2 board)

(3) Adjust RV23 so that the lock points of the A-CH and the B-CH are at the points shown in Fig. 4-4-20.

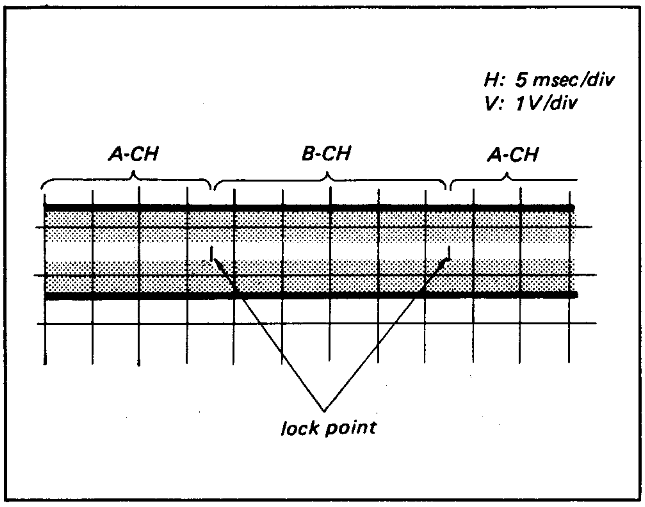


*Fig. 4-4-20. AFC offset adjustment*

11. ACC Adjustment

(1) Supply the VTR with the colour bar signal and set up the E-E mode.

(2) Connect the oscilloscope to pin 8 of IC5.

(3) Adjust T4 for minimum output level.

(4) Adjust RV24 for 1.3V ± 0.05 Vp-p. (See Fig. 4-4-21.)

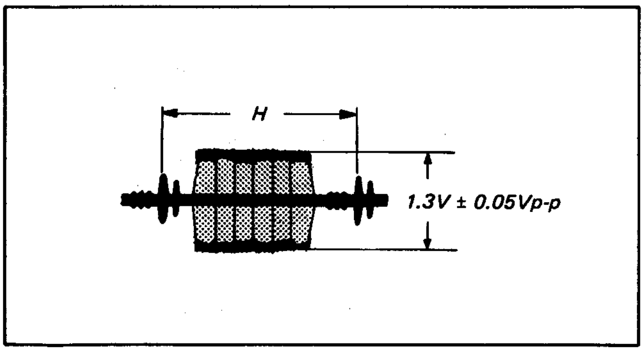


*Fig. 4-4-21. ACC adjustment*

12. X'tal Oscillation Adjustment

(1) Set up the PLAY mode.

(2) Connect the frequency counter to emitter of Q90.

(3) Adjust T7 for an oscillating frequency of 4.40625 MHz.

(4) Check that the output level is 0.6 V ± 0.1 Vp-p. (See Fig. 4-4-22.)

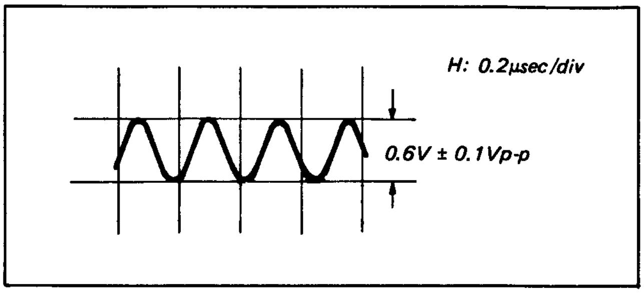


*Fig. 4-4-22. Output level check*

13. Injection Oscillating Frequency Adjustment

(1) Do not supply the VTR with any signal and set up the E-E mode.

(2) Connect the frequency counter to emitter of Q91.

(3) Adjust LV2 on the CF-2 board so that the oscillating frequency is 4.40625 MHz ± 1 kHz.

(4) Check that the output level is 0.8 V ± 0.2 Vp-p. (See Fig. 4-4-23.)

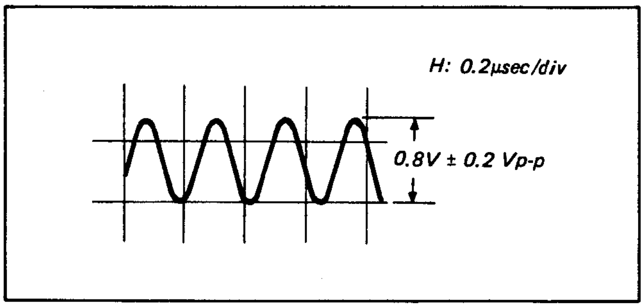


*Fig. 4-4-23. Output level check*

14. Chroma Record Current Adjustment

(1) Supply the VTR with the colour bar signal and set up the E-E mode.

(2) Connect the oscilloscope to center tap of RV20.

(3) Adjust RV20 for a chroma signal level of 170mV ± 10 mVp-p. (See Fig. 4-4-24.)

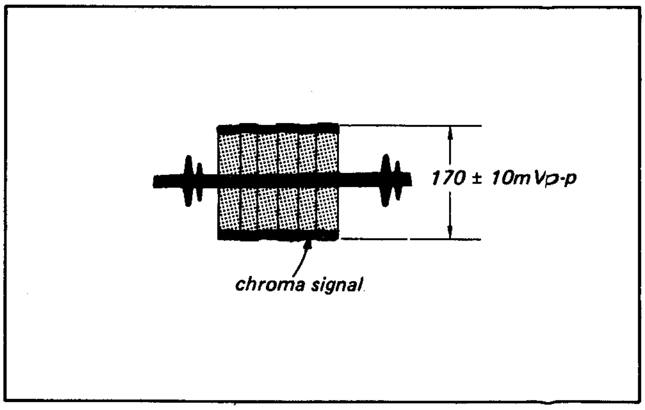


*Fig. 4-4-24. Chroma record current adjustment*

(4) Check that the level of the pilot burst signal is 0.4 V ± 0.05 Vp-p. If not, adjust RV18. (See Fig. 4-4-24.)

15. Test Signal Frequency Adjustment

**[Adjustment with Frequency Counter]**

(1) Turn on the TEST SIG switch.

(2) Connect the frequency counter to collector of Q60.

(3) Adjust RV13 for 15.625 kHz ± 100 Hz.

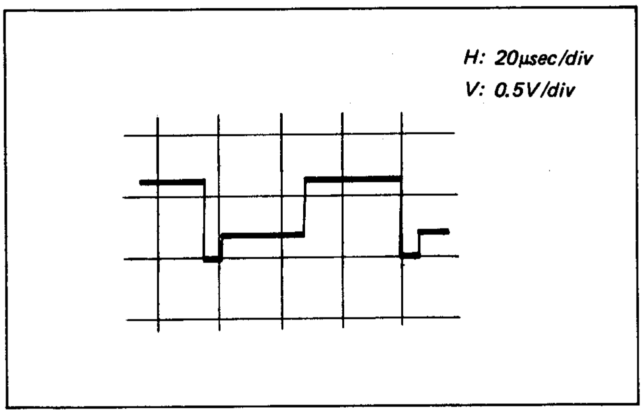


*Fig. 4-4-25. Output waveform*

**[Adjustment by Observing Monitor TV]**

(1) Turn on the TEST SIG switch.

(2) Adjust RV13 so that the monitor TV picture becomes as shown in Fig. 4-4-26.

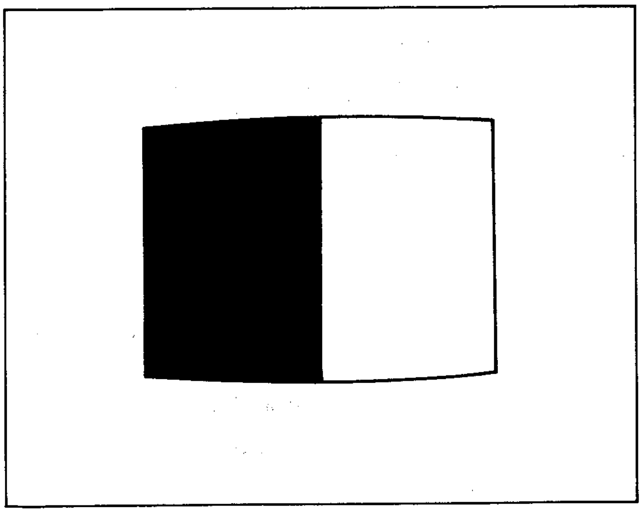


*Fig. 4-4-26. Test signal adjustment*

**[RF-2 Board]**

1. Record Current Frequency Characteristic Adjustment

(1) Set up the no-signal input state and set up the RECORD mode.

(2) Connect the oscilloscope to TP1 and the GND probe to TP2.

**Note:** Since TP2 is the REG 12 V line, do not connect the GND probe to the points other than TP2.

(3) Adjust RV6 for a signal level of 130 mVp-p. (See Fig. 4-4-27.)

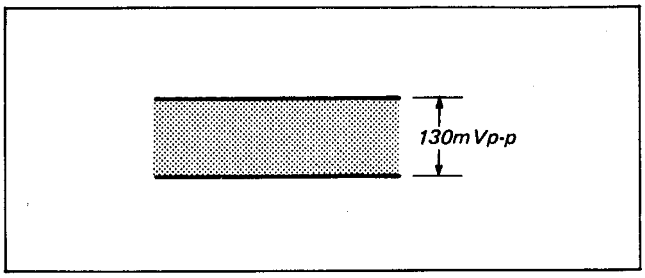


*Fig. 4-4-27. Record current frequency characteristic adjustment*

2. Playback Amplifier Frequency Characteristic Adjustment

(1) Play back the RF sweep signal segment of the alignment tape.

(2) Connect the oscilloscope to TP5.
TRIG: EXT (TP3, RF SW PULSE)
TRIG SLOPE $\left\{\begin{array}{l} + \ldots \text{CH-B} \\ - \ldots \text{CH-A} \end{array}\right.$

(3) Adjust the TRACKING knob for maximum signal level.

(4) Make the signal level from 1 MHz to 5.2 MHz flat.

A-CH . . . . . RV1
B-CH . . . . . RV2

(See Fig. 4-4-31.)

(5) Adjust RV3 so that the signal levels between 1 MHz and 2 MHz are all the same in the A-CH and B-CH.

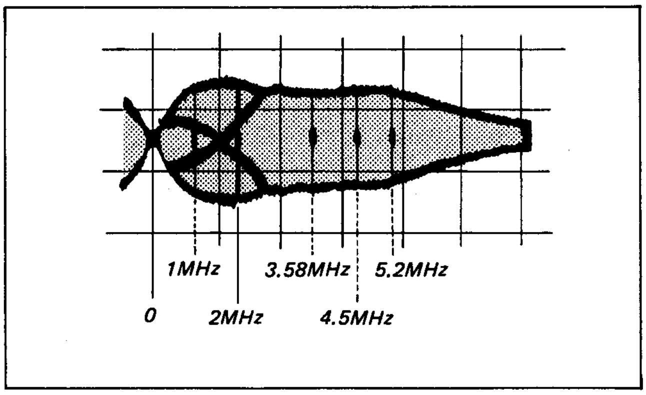


*Fig. 4-4-28. Playback amplifier frequency characteristic adjustment*

3. Dropout Compensation Adjustment

(1) Play back a blank tape.

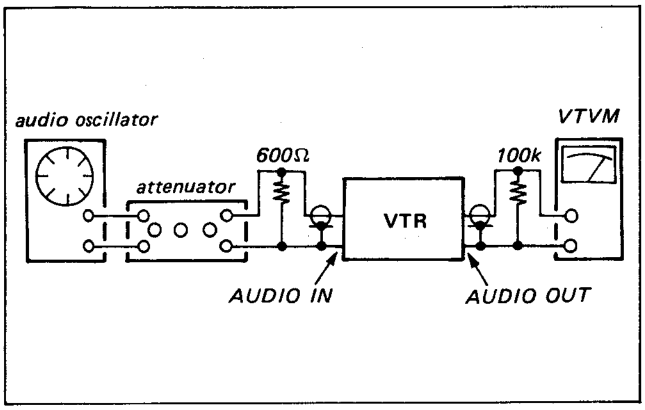
(2) Connect the oscilloscope to pin 2 of IC1.
INPUT: DC range

(3) Set RV4 to the point where the voltage at pin 2 of IC1 changes to 0.6 Vdc from 0 Vdc.

(4) Play back a recorded tape which has dropouts and check that the dropouts are compensated.

## 4-5. AUDIO SYSTEM ALIGNMENT (AS-3 Board)

**[Connection of Relative Equipment]**



**[Adjustment Sequence]**

1. Audio Head Adjustment
2. Playback Frequency Characteristic Adjustment
3. Playback Output Level Adjustment
4. Bias Oscillator Check
5. Bias Trap Adjustment
6. Record Bias Adjustment
7. Record Level Adjustment
8. Audio Dubbing Bias Adjustment
9. Overall Frequency Characteristic Check
10. Overall S/N Ratio Check
11. Overall Distortion Check

1. Audio Head Adjustment (Refer to the SECTION 3-19)
2. Playback Frequency Characteristic Adjustment
   (1) Play back the 333 Hz and 5 kHz segments of the alignment tape.
   (2) Adjust RV404 so that the output level difference between 333 Hz and 5 kHz is within +1.5 ± 1 dB.
3. Playback Output Level Adjustment
   (1) Play back the 333 Hz segment of the alignment tape.
   (2) Adjust RV403 so that the output level is within −25 ± 1 dB.
4. Bias Oscillator Check
   (1) Insert the cassette and set up the RECORD mode.
   (2) Connect a pickup coil (approx. 33mH) to the frequency counter and move the counter to T401 (in the shield case).
   (3) Check that the oscillating frequency is 65 kHz ± 6.5 kHz.
5. Bias Trap Adjustment
   (1) Set the input signal level to zero. (Set the audio oscillator output to zero and the attenuator to maximum.)
   (2) Connect the oscilloscope to the collector of Q406.
   (3) Adjust LV401 for minimum bias leak.
   Value: minimum level below 1 Vp-p.
6. Record Bias Adjustment

   Check that the playback frequency characteristic adjustment has been completed.

   (1) Connect TP402 and TP403 (GND) with a jumper so as to turn off the AGC operation.
   (2) Set the oscillator frequency to 333 Hz and adjust the AUDIO OUT terminal level with the attenuator for −25 dB.
   (3) Record the signal.
   (4) Change the audio signal to 7 kHz at −25 dB.
   (5) Record the signal.
   (6) Play back the recorded signals.
   (7) Ensure that the output level of 7 kHz is within ±1 dB against the one of 333 Hz.
   (8) If not, adjust RV402 and repeat Steps (2) through (7) until the specification is satisfied.
   (9) Remove the jumper connected to TP402.
7. Record Level Adjustment
   (1) Connect TP402 and TP403 (GND) with a jumper so as to turn off the AGC operation.
   (2) Set the oscillator frequency to 333 Hz and adjust the AUDIO OUT terminal level with the attenuator for −5 dB.
   (3) Record the signal.
   (4) Play back the recorded signal.
   (5) Ensure that the output level is within −5 ± 1 dB.
   (6) If not, adjust RV401 and repeat Steps (2) through (5) until the specification is satisfied.
   (7) Remove the jumper connected to TP402.
8. Audio Dubbing Bias Adjustment
   (1) Connect TP402 and TP403 (GND) with a jumper so as to turn off the AGC operation.
   (2) Set the oscillator frequency to 333 Hz and adjust the AUDIO OUT terminal level with the attenuator for −25 dB.
   (3) Set up the AUDIO DUB mode.
   (4) Change the oscillator signal to 7 kHz, −25 dB and set up the AUDIO DUB mode.
   (5) Play back the signals.
   (6) Ensure that the output level of 7 kHz is 0 ± 1 dB against the one of 333 Hz.

(7) If not, adjust LV402 and repeat Steps (2) through (6) until the specification is satisfied.

(8) Remove the jumper connected to TP402.

9. Overall Frequency Characteristic Check

(1) Set the oscillator frequency to 333 Hz and adjust the AUDIO terminal level with the attenuator for −25 dB.

(2) Record the signal.

(3) Change the oscillator signal to 50 Hz, 100 Hz, 3 kHz, 5 kHz, 7 kHz and 10 kHz.

(4) Record the signals.

(5) Play back the recorded signals.

(6) Ensure that the output levels are within the specified values. (See Fig. 4-5-1.)

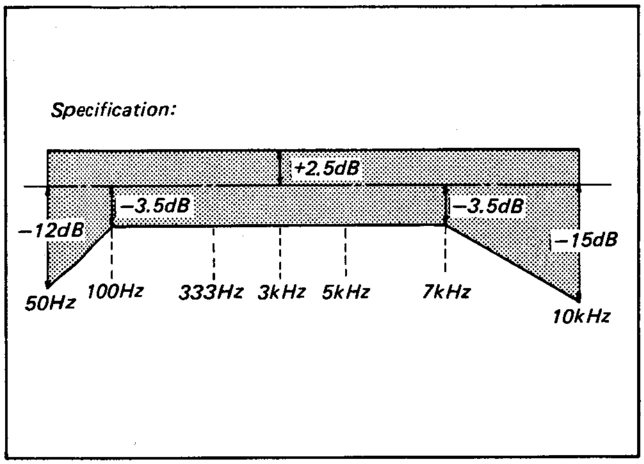


*Fig. 4-5-1. Overall frequency caracteristic check*

10. Overall S/N Ratio Check

(1) Terminate the AUDIO IN terminal.
(no signal input)

(2) Insert the cassette and set up the record mode.

(3) Open the AUDIO IN terminal and supply the 333 Hz at −10 dB signal to AUDIO IN terminal.

(4) Record the signal

(5) Play back the two segments.

(6) Ensure that the output level difference between two segments is more than 40 dB.

11. Overall Distortion Check

(1) Set the oscillator frequency to 400 Hz and adjust the AUDIO OUT terminal level with the attenuator for −10 dB.

(2) Record the signal.

(3) Connect the distortion meter to the AUDIO OUT terminal.

(4) Play back the recorded signal and ensure that the distorition is less than 4%.

## 4-6. TUNER BLOCK SYSTEM ALIGNMENT

1. CH-7 Board Clock Adjustment

(1) Connect the frequency counter to pin 3 of IC4.

(2) Adjust RV001 for 15.625 ± 0.3 kHz.

2. Video Output Level & Tuner AGC Adjustment (TU-13 Board)

(1) Receive the colour-bar signal (UHF, level 66 dBμ)

(2) Connect the oscilloscope to TP19 (Emitter of Q4).

(3) Adjust RV002 for 2.8 Vp-p.

(4) Connect the digital voltmeter to TP15.

(5) Adjust RV001 for $6.0 \pm {}^{0.1}_{0.3}$ V.

## 4-7. TIMER SYSTEM ALIGNMENT (TM-10 Board)

1. Oscillating Frequency Adjustment

(1) Connect the frequency counter to TP2 (pin 1 of IC6).

(2) Adjust CV1 for 60 Hz.
Specification: within 60 Hz ± 0.5 Hz/day

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